



**NATIONAL TRANSPORTATION SAFETY BOARD**

Office of Aviation Safety  
Washington, DC

September 20, 2019

**Group Chairmen's Factual Report**

**OPERATIONAL FACTORS/ HUMAN PERFORMANCE**

**CEN19FA072**

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## A. ACCIDENT

Operator: Viking Aviation, Inc. (dba Survival Flight)  
Location: Zaleski, Ohio  
Date: January 29, 2019  
Time: 0650 EST<sup>1</sup>  
Aircraft: Bell 407 helicopter, registration number N191SF

## B. OPERATIONAL FACTORS / HUMAN PERFORMANCE GROUP

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## C. SUMMARY

On January 29, 2019, about 0650 Eastern standard time, a single-engine, turbine-powered, Bell 407 helicopter, N191SF, collided with forested, rising terrain about 4 miles northeast of Zaleski, Ohio. The helicopter was registered to and operated by Viking Aviation, LLC, doing business as Survival Flight, Inc., as a visual flight rules helicopter air ambulance flight under the provisions of 14 *Code of Federal Regulations* Part 135 when the accident occurred. The certificated commercial pilot, flight nurse, and flight paramedic were fatally injured, and the helicopter was destroyed. Visual meteorological conditions existed at the departure location, and company flight following procedures were in effect. The flight departed Mt. Carmel Hospital, Grove City, Ohio at 0628, destined for Holzer Meigs Hospital, Pomeroy, Ohio, about 69 miles southeast.

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<sup>1</sup> Eastern Standard Time – all times in this report will be in EST unless otherwise stated. At the time of the event Universal Time Coordinate (Zulu) was minus 5 hours.

## **D. DETAILS OF THE INVESTIGATION**

On January 31, 2019, the human performance group chairman joined the investigator in charge to conduct interviews with medical staff at Mt Carmel Hospital in Grove City, OH, near Survival Flight Base 14 where the accident flight originated.

On the week of February 4, 2019, the operations/human performance group was formed and convened in Batesville, Arkansas to conduct interviews with company management, operations control, and pilots. Telephone interviews were conducted with several former and current pilots and medical personnel.

On March 14, 2019, the operations group chairman conducted a telephone interview of the Emergency Room Technician at Holzer Meigs Hospital who requested the flight.

## **E. FACTUAL INFORMATION**

### **1.0 History of Flight**

#### **1.1 Flight Request**

An Emergency Room Technician (ERT) at the Holzer Meigs Hospital stated that she first contacted MedFlight, another helicopter air ambulance (HAA) operator, for a patient transport flight from Holzer Meigs Hospital to the Riverside Methodist Hospital in Columbus, Ohio. After MedFlight refused the flight due to weather, she contacted HealthNet Aeromedical Services with the same request.<sup>2</sup> HealthNet did not immediately refuse the flight and told her that they would perform a “weather check” and get back to her.<sup>3</sup> The ERT said that after ending the call with HealthNet, she contacted Survival Flight (Viking Aviation). She had not received a response from HealthNet when the flight was accepted by Viking Aviation, but she later received a call from HealthNet refusing the flight due to weather.

At 0609, the ERT contacted the Viking Aviation Operations Control Center (OCC) with the request.<sup>4</sup> According to OCC communication recordings, at 06:11:05, the operations control specialist (OCS) contacted the Survival Flight (SF) Base 14 pilot on duty (evening shift pilot) for

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<sup>2</sup> In an interview with senior Medflight personnel, they stated that Medflight was the first company the requesting agency had called. The call came in at 6:01EST and the weather was yellow. They stated that the METAR showed decent weather but there was an ICING AIRMET between 0 and 8000 ft. There were snow showers as well. Between the snow showers and the icing – those were the primary reasons they turned down the flight. The HEMS tool said that there was a more than 75% chance of icing above 1000 ft.

<sup>3</sup> The VP for HealthNet Aeromedical Services stated in an interview that they received a request for air transport about 0615 at their base in Millwood, West Virginia. He said it took them about 6 minutes to evaluate the weather and turn down the flight due to low cloud ceilings and visibility. He said when they called the requesting facility back to decline the flight, the requester told them that Survival Flight had already accepted it.

<sup>4</sup> For the purposes of this report any reference to the OCC refers to an operations control center, equivalent to an operational control center

a weather check. About 28 seconds later, the flight was accepted by the evening shift pilot and the OCS was told that the day shift pilot (accident pilot) was five minutes away from base and may take the flight. At 06:12:10, the OCS agreed to the pilot change.

The pilot that was going off duty stated that after informing OCS that they would be accepting the flight, he asked the accident pilot while she was driving to the helicopter if she needed anything. He had already briefed the accident pilot concerning the flight request and the accident pilot had told him she already had her helmet and knee-board with her. He asked if she needed the night vision goggles (NVGs) and she told him that she did not. He then notified the medical crew that there was a flight request and proceeded to the helipad to prepare the helicopter. By the time the accident pilot arrived he had the helicopter started and was preparing to program the waypoint information into the navigation system. He handed the accident pilot the pilot phone and she boarded the helicopter. He then returned to the base.

OCC recordings indicated at 0625, the accident pilot contacted the OCS via onboard satellite radio to confirm the destination for the flight. At 0627, the accident pilot again called the OCS, but this time to request the coordinates of Holzer Meigs Hospital. At 0629, the OCS called the accident pilot requesting her flight release information. She replied with her flight risk assessment, "I'm green all categories." The last communication between the accident pilot and OCS occurred during an exchange at 0630, at which time the accident pilot requested patient information. The OCS then provided the patient age, gender and diagnosis.

The helicopter was equipped with an Outerlink Global Solutions IRIS flight data monitoring system, which provided real-time flight tracking data. The flight tracking information is relayed via satellites to an internet-based storage location in 10-second intervals. According to the IRIS data, the recorded data began about 06:23:18 and recorded the helicopter stationary on the helipad at the Mt. Carmel Hospital. The helicopter remained stationary on the helipad until about 06:28:15 when it lifted off and travelled southeast.<sup>5</sup> After liftoff, the helicopter continued on a predominately straight track for about 47 nautical miles. The Outerlink data ended about 06:50:08 and showed the helicopter about 0.7 nautical miles and 258 degrees from the accident site.<sup>6</sup>

The OCS that was tracking the flight stated that he had no contact with the pilot after the helicopter lifted off. He said that about 15 to 20 minutes into the flight, he saw the helicopter make a turn to the right and then, shortly after that, make a sharp turn left, as if it was turning around. Then he noticed the helicopter track stopped and shortly afterward the no tracking alarm went off. He then enacted the company emergency action plan.

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<sup>5</sup> Lift off was determined when the radio altimeter changed from indicating an altitude of 0 to an altitude of 1ft AGL

<sup>6</sup> Refer to Performance Study for additional details on accident flight path.

## **2.0 Personnel Information**

### **2.1 Certificates and Ratings**

The pilot in command (PIC), age 34, held a Federal Aviation Administration (FAA) issued Commercial Pilot Certificate with Helicopter and Instrument Helicopter ratings. The certificate also listed Private Pilot privileges for Airplane-Single Engine Land and Instrument Airplane. She also held a Certificated Flight Instructor Certificate with Helicopter and Instrument Helicopter ratings. The PIC was issued a second-class airman medical certificate on November 14, 2018, with no limitations.

### **2.2 Training and Proficiency Checks**

Viking Aviation utilized an approved training program as required by 14 *Code of Federal Regulations* (CFR) Part 135.341. The training manual contained sections addressing basic indoctrination training, general emergency training, aircraft ground training, aircraft flight training, differences training, special segments training, qualification, and instructor training. Within each of these categories, subject matter topics and completion standards were specified.

The pilot received initial new hire training which included ground and flight training from the operator beginning April 23, 2018 through April 27, 2018, culminating in the satisfactory completion of an Airman Competency/Proficiency Check in a Bell 206 helicopter on April 27, 2018. According to the Viking Aviation training manual, initial new hire training consisted of 54-67 hours of flight and ground training combined. The documentation showed that the pilot was subsequently assigned duties as a pilot-in-command for Bell model 206 helicopters.

The training and the subsequent competency check were all performed in Bell 206 helicopters with the exception of differences training for the Bell 407 that was conducted on April 26, 2018. No competency check was completed in the Bell 407. The Aircrew Training Manual only listed Bell 206 training and noted that Viking Aviation only has Bell 206 helicopters.

### **2.3 Flight Times**

The pilot's flight logbook was not available for review. Operator records indicated that the pilot had 1,855 hours total flight experience, including 589 hours in turbine helicopter, 1,125 hours in piston helicopter, 264 hours at night, 104 hours of instrument flight experience, and 14.9 hours experience in Bell 206 helicopters prior to her employment. There was no record of the pilot having experience in Bell 407 helicopters prior to her employment with SF.

Company flight logs for May 2018 through December 2018 indicated that the pilot had flown a total of 94.8 hours, including, about 98 hours in Bell 407 aircraft, 57.2 hours during the day, 16.4 hours at night, and 9.7 hours at night using night vision goggles.<sup>7</sup>

## **2.4 Pilot 72-Hour History**

The accident pilot was working a schedule of day shifts from 0700 – 1900 since January 23. On January 28, the day prior to the accident, she ended her shift around 1730. Her fiancé stated her activities in the days prior to the accident were routine where she would return home after her shift, make dinner and go to bed. Her last cell phone activity that night was an outbound phone call that ended about 2105. Because the night shift pilot had arrived earlier the night before as her shift was ending, she planned to arrive earlier for her shift the morning of the accident. She was enroute to work when she received a phone call from the night shift pilot at 0612 the morning of the accident.

## **2.5 Pilot Background Information**

The pilot resided in Columbus, OH with her fiancé. The night shift pilot stated that the accident pilot looked “like herself,” alert, and “ready to go.” The lead pilot at her former base, for whom she worked with for 5 months stated that she “was eyes wide open, listening to everything [he] had to say.” One of the other pilots at her current base described her as “safety conscious, conservative, and pretty attuned to her crew... People loved her.”

## **2.6 Medical and Pathological Information**

An autopsy of the pilot was performed by the Montgomery County Coroner’s Office, Dayton, Ohio. Her cause of death was multiple blunt force injuries.

Toxicology testing performed by the laboratory at FAA Forensic Sciences on specimens from the pilot, was negative for drugs, ethanol, and carbon monoxide.

## **3.0 Aircraft Information**

The Bell Model 407 is a civil utility helicopter, a derivative of the Bell 206L-4 LongRanger. The 407 has a 4-bladed rotor system with a rigid, composite rotor hub instead of the Model 206’s 2-bladed conventional rotor. The Bell 407 is frequently used for corporate and offshore transport, air ambulance, law enforcement, electronic newsgathering and movie making.

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<sup>7</sup> The flight logs did not differentiate the make and model of helicopter flown. According to the Viking Aviation party representative, the accident pilot had made 3 flights during training in a Bell 407 helicopter totaling 3.3 hours of flight time, including 1.2 hours of night/NVG flight. He also reported that all of her flight time with the company after her training was in Bell 407 helicopters. Based on this information the pilot would have had about 98 hours in Bell 407 helicopters, including about 18 hours of night flight time and 11 hours of NVG time.

The Bell 407 features the four-blade main rotor developed for the OH-58 (Model 406). The blades and hub use composite construction, have no life limits, and provide improved performance and better ride comfort.

The 407 are also 8 in (18 cm) wider, increasing internal cabin width and space, and features 35% larger main cabin windows. The more powerful Rolls-Royce (Allison) 250-C47 turbo shaft allows an increase in max takeoff weight and improves performance at hotter temperatures and/or higher altitudes.

#### General characteristics

- Crew: 1 pilot
- Capacity: Typical seating configuration for seven comprising of pilot and passengers, with five passengers in main cabin.
- Length: 41 ft 8 in (12.7 m)
- Rotor diameter: 35 ft 0 in (10.67 m)
- Height: 11 ft 8 in (3.56 m)
- Disc area: 962 ft<sup>2</sup> (89 m<sup>2</sup>)
- Empty weight: 2,668 lb (1,210 kg)
- Useful load: 2,347 lb (internal) (1,065 kg (internal))
- Max takeoff weight: 6,000 lb (2,722 kg)
- Power plant: 1× Allison 250-C47 turbo shaft, 700 shp (520 kW)
- Propellers: 4 blade rotor

#### Performance

- Maximum speed: 140 knots (260 km/h)
- Cruise speed: 133 knots (246 km/h)
- Range: 330 nm, (612 km)
- Service ceiling: 18,690 ft (5,698 m)

#### Maximum Gross Weight

- Internal: 5,000 lb (2,268 kg)
- External: 6,000 lb (2,722 kg)

#### Typical Useful Load

- Internal: 2,347 lb (1,065 kg)
- External: 2,646 lb (1,200 kg)

### 3.1 Survival Flight Bell 407, N191SF

The Survival Flight aircraft registration number N191SF was a Bell 407 manufactured in 1996, Serial Number 53006.

A Rolls Royce Allison 250 C-47B Turbo-Shaft engine, serial number CAE-847007 powered N191SF. Both the engine and the airframe had accumulated 1179.7 hours total time in service and

the helicopter had 2,652 engine starts and 5,058 landings as of the end of the day preceding the accident.

The helicopter was equipped with the following equipment:

- Night vision imaging system (NVIS), installed under STC SR09350RC in June 2018.
- Snow deflector, installed under STC SR00401DE in June 2018.
- Garmin GTN 650 installed under STC SR02120SE in June 2018.
- Installed Garmin GRA 55 radar altimeter under STC SR02597LA in July 2018.
- Garmin G500H EFIS, under STC SR02295LA in July 2013.
- Garmin GTS800 TCAS installed under STC SA02016SE-D in July 2013, interfaced to a G500H.
- Garmin GDL69A XM Wx/Radio system installed under STC SA01487SE-D in July 2013, interfaced to the G500H EFIS.
- Outerlink SATCOM and FDM under STC SR00365BO in June 2018.
- Medical equipment installed under various STCs in June 2018

Based on the reported crew weights, equipment loading, and fuel load, the helicopter's weight and center of gravity would have been within the manufacturer's prescribed limits.<sup>8</sup>

#### **4.0 Company Overview and Operations**

At the time of the accident, Viking Aviation was an on-demand air taxi operator and operated in accordance with FAA Approved Operations Specifications (Ops Specs), for a 14 CFR Part 135 operation under certificate number 2VKA986M, issued December 15, 2011. The company headquarters was in Batesville, Arkansas, and they operated a fleet of 3 Bell 206 helicopters, 13 Bell 407 helicopters, one Pilatus PC-12 airplane, and one Sikorsky S-76 helicopter, providing air ambulance services. The company had 15 helicopter bases in Arkansas, Alabama, Illinois, Ohio, Missouri and Oklahoma.

Ops Spec A003-1, dated March 10, 2011, contained authorization for visual flight rules (VFR) day and night operations using Bell 206 and Bell 407 helicopters. Instrument flight rules (IFR) day and night operations were authorized using the Pilatus PC-12 airplane. Ops Spec A021-1 dated March 16, 2016 contained authorization to conduct HAA operations. The weather minimums prescribed for HAA operations in the Ops Specs (A050-1) and 14 CFR Part 135.609, were:

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<sup>8</sup> Refer to Attachment 19 for weight and balance calculation

Table 1. 14 CFR § 135.609 - VFR ceiling and visibility requirements for Class G airspace.

Location	Day		Night		Night using approved NVIS or HTAWS	
	Ceiling	Visibility	Ceiling	Visibility	Ceiling	Visibility
Nonmountainous local flying area	800-feet	3 statute miles	1,000-feet	3 statute miles	800-feet	3 statute miles
Nonmountainous non-local flying area	800-feet	3 statute miles	1,000-feet	5 statute miles	1,000-feet	3 statute miles
Mountainous local flying area	800-feet	3 statute miles	1,500-feet	3 statute miles	1,000-feet	3 statute miles
Mountainous non-local flying area	1000-feet	3 statute miles	1,500-feet	5 statute miles	1,000-feet	5 statute miles

#### 4.1 Management Organization

The General Operations Manual (GOM), Section A: Management and Operational Control listed the company management structure was as follows:

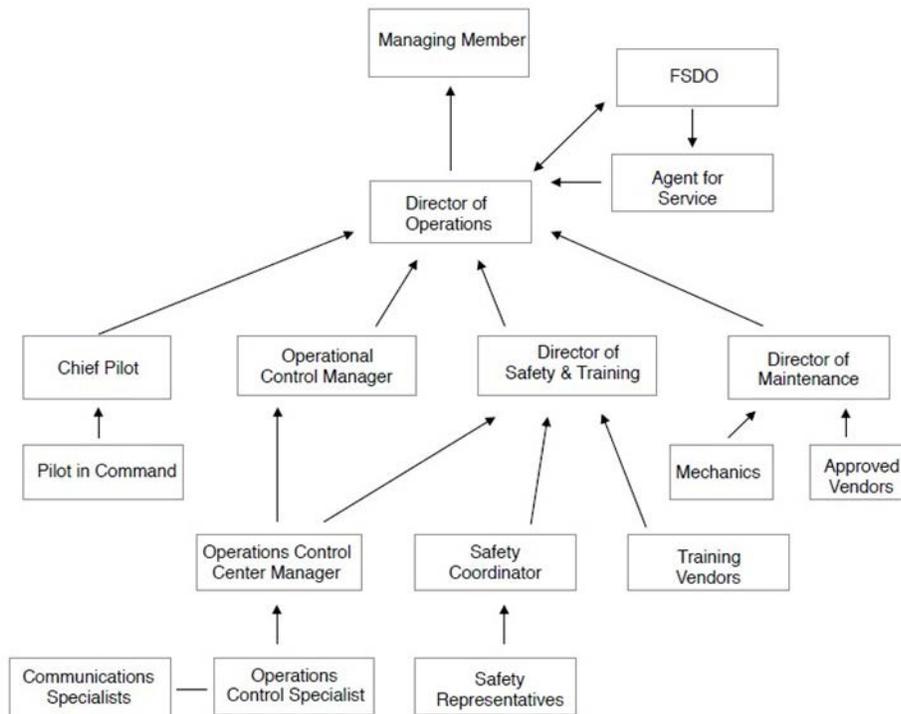


Figure 1. Survival flight organizational chart (reproduced from company GOM).

## 4.2 Operations Control Center (OCC)

The operator had an OCC as required by 14 CFR 135.619 for HAA operators with more than 10 aircraft. The purpose of the OCC as stated in the operator's GOM was for assisting with operational supervision and control. The OCC is primarily responsible for flight surveillance while providing advisory information affecting the operator's aircraft.

The OCC was located at the Survival Flight company headquarters in Batesville, Arkansas. The OCC had multiple workstations and was staffed at all times. Staffing consisted of an operational control manager (OCM), an operations control specialist (OCS) and a communications specialist (CS). Employees authorized as an OCS could also serve as CS. At the time of the accident Survival Flight had four employees that could fulfill the role of OCM and 12 employees for OCS/CS duties.

The OCM had operational control and was responsible for all actions associated with the OCC and OCC personnel. Survival Flight utilized four OCMs: the director of operations (DO), chief pilot, director of safety and training and OCC manager.<sup>9</sup>

Three of the four OCMs, the director of operations, chief pilot, and director of safety and training, were certificated helicopter pilots, all having experience in HAA operations. The fourth OCM, the OCC manager, was not a certificated pilot and had no aviation experience. She had attended college receiving a business degree. She had been employed by Viking Aviation for about 5 years and was the OCC manager for about 2 years. Prior to becoming OCC manager, she had worked in the billing, membership, and marketing departments, and had worked in the OCC. When asked about her training or experience to be able to exercise operational control in accordance with 14 CFR §119.69, the director of operations stated that she had to function as an OCS and understand which resources to reference if a problem comes up. He said, "her background was enough, and we wrote in her resume and her job title as operational control manager enough keys to show that she was capable of operational control."

The OCC was configured with multiple workstations available for OCS/CS personnel.<sup>10</sup> Each workstation had multiple monitors which allowed the OCS/CS to display various screens containing information pertinent to the flight under their control. Weather and tracking information were routinely displayed along with other pertinent information as deemed necessary.

The duties of an OCS, included preflight risk mitigation strategies, risk control measures, and the use of a shift change checklist. GOM Volume 1, Section T.13 listed the following minimum duties of an OCS:

- *“Reports to the Director of Operations through the Director of Safety and Training.*
- *Interfaces with the Operational Control Manager.*
- *Briefs Operational Control Manager of the status of all bases.*
- *Verifies the Qualification and Documentation of on duty PICs.*

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<sup>9</sup> The position of operations control center (OCC) manager was referred to in multiple names such as occupational control center manager, operational control manager, and optional control manager. For the purposes of the report, this individual will be referred to as "operations control center (OCC) manager."

<sup>10</sup> A photograph of the OCC workstation can be found in the weather factual report.

- *Answers all incoming requests for service in a professional and courteous manner.*
- *Initiates Emergency Action Plan (EAP) when necessary.*
- *Notifies Certificate Management of accidents, incidents, or other significant all flight conditions that may affect Viking Aviation aircraft from takeoff to landing IAW FARs and the Viking Aviation General Operations Manual.<sup>11</sup>*
- *Assists Communication Specialists with Options for Enroute Adverse Weather Conditions.*
- *Assumes flight following responsibilities for aircraft when a Communication Specialists is unavailable.*
- *Ensures a thorough knowledge of the Viking Aviation General Operations Manual.*
- *Completes the initial and recurrent Training and Examinations IAW the Viking Aviation Operations Control Center Training Manual.*
- *Monitors Flight Log for compliance.*
- *Ensures a thorough knowledge of FAR Part 91 and 135 regulations.*
- *Responsible for meeting operational goals, initiatives, and objectives.*
- *Monitor the Progress of the Flight. The OCS is required to monitor the progress of each HAA flight. This may be accomplished through a variety of means, including satellite tracking, position reports, etc. Weather conditions in the area(s) of operation should be monitored with respect to each HAA flight's progress, and a documented method should be established to communicate adverse or forecast deteriorating weather conditions to the HAA pilot. In the event the OCS cannot directly monitor a flight's progress via satellite or other graphic means, Viking Aviation has established procedures for monitoring the flight via position reports or other means.*
- *Analyzes aviation weather to determine marginal and hazardous conditions for flight. The OCS provides pilots with weather briefings, to include current and forecast weather along the planned route of flight. While the OCS may obtain weather from non-National Weather Service (NWS) sources to aid in situational awareness, only information derived from the NWS or other FAA-approved sources should be relayed to the HAA pilot for use in making a "Go" decision. This information provided may be relayed to the HAA pilot by an appropriately trained CS.*
- *OCS shall issue an Advisory the pilot to decline, divert, abort, or reroute the flight. The OCS should never provide an opinion to the pilot suggesting that a flight can be initiated or completed when weather is a factor. Likewise, in the opinion of the pilot, whenever a flight should not be initiated or continued due to weather or other safety factors, the OCS should not suggest or direct otherwise.*
- *Understands and applies the Viking Aviation Risk Assessment Program and how Risk Assessment Levels are determined. Risk Mitigation. Risk mitigation and its effectiveness in reducing risk is an essential component of the risk analysis program. If the risk assessment rates an individual risk element highly, mitigations may be advisable. Risk mitigations should be preplanned and preapproved, not assembled at the time of need, as unintended consequences may result. Following application of an effective mitigation, the associated individual and total residual risk factor should be reassessed. This risk mitigation/re-assessment cycle should be repeated until all higher risks are effectively mitigated. Risks that remain high must either be acknowledged and accepted in accordance with the*

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<sup>11</sup> IAW acronym refers to "in accordance with"

*operator's risk analysis program, or the proposed original flight operation or proposed flight operation modification should be declined.*

- *The OCS must ensure the pilot has completed all required items on the preflight risk analysis worksheet. Procedures for determining the minimum items to be completed on the risk analysis should be detailed in the Viking Aviation approved risk analysis program.*
- *The OCS must confirm and verify all entries on the preflight risk analysis worksheet. The process of confirming and verifying the risk analysis entries should be documented in the risk analysis program.*
- *Emergency Assistance Capabilities. In addition to those duties required by regulation, the OCS can play an important role in providing emergency assistance to PICs during emergency situations such as an encounter with inadvertent instrument meteorological conditions (IIMC). In many circumstances, the OCS may be able to observe aircraft position and maintain communications with the PIC when the aircraft is below air traffic control (ATC) radar and communications coverage. Under these circumstances, the OCC may need to relay information to ATC regarding an aircraft declaring an emergency and the pilot's intentions. Additionally, the only means by which the PIC may be able to receive accurate weather information or route recommendations to escape severe or deteriorating weather may be through the OCS.*
- *Organizes all Sources of Flight Information to determine and develop an Operational Control Center Hazard to Flight Advisory.*
- *Rapidly disseminates Advisories to the appropriate Pilot's or Communication Specialties of known or forecasted severe weather conditions, TFRs, or any concerns pertaining to safety of flight.*
- *Assists Communication Specialists with options for aircraft with enroute deteriorating weather conditions.*
- *Records all information transmitted to the Operational Control Center.*
- *Coordinates with the PIC and AMP for post-flight debriefings.*
- *Maintains 24/7 staffing of the Operations Control Center.*
- *Performs other duties as assigned."*

The duties of the CS were listed in the GOM as follows:

- *"Receive flight request from customers (hospitals, EMS agencies, etc.)*
- *Prior Refusal/Rejection of Flight Requests. Collect information regarding prior refusals or rejections from the requestor. This information is required for risk analysis process IAW 135.617 and is most easily acquired when receiving a flight request.*
- *Coordination. In some high demand situations, the CS may notify the OCC of the content of a flight request in addition to, or instead of, the pilot.*
- *Communication. Provide communication relay between the OCS and the pilot in flight.*
- *Recording and Relaying of Flight Position. Though the OCC must monitor the progress of each HAA flight, a CS may maintain a secondary awareness of current location of each HAA flight operation.*
- *Unplanned Events. Advise the OCC of unplanned events during an HAA operation. May include diversions, precautionary landings, or any other event deemed appropriate by the certificate holder.*

- *Emergency Action Plan (EAP). Procedures should be documented for the CS to follow at the direction of the OCS in the event of an overdue aircraft or if an aircraft is known to have been involved in an accident or incident.*
- *Performs other duties, except OCS duties IAW 135.619(a), deemed necessary and appropriate by Viking Aviation.”*

### **4.3 Flight Crew Responsibilities**

According to Survival Flight policy, HAA pilots were responsible for making the final decision for flight acceptance based on operational considerations including weather, duty time limitations, site location, and personal capability. The pilot was expected to accept or decline the flight based on aviation criteria only. Medical factors were not to be made available to the pilot until the flight was accepted. Air medical personnel would assess the medical appropriateness of air transport based upon information received from the OCC.

### **4.4 Flight Data Monitoring (FDM)**

14 CFR 135.607, titled “Flight Data Monitoring System” stated, in part:

*“After April 23, 2018, no person may operate a helicopter in air ambulance operations unless it is equipped with an approved flight data monitoring system capable of recording flight performance data.”*

Installation of flight data monitoring (FDM) equipment capable of recording flight performance data was required by 14 CFR 135.607. The operator employed FDM into their helicopter operations by use of the Outerlink IRIS FDM and satellite communications system. This system allowed real time monitoring of the helicopter’s position as well as providing communication capability with the aircraft crew. The IRIS system was capable of monitoring numerous aircraft parameters in addition to location information and transmitting that data electronically. The accident helicopter was configured to record time, collective pitch, ground speed, pitch angle, power turbine speed, pressure altitude, roll angle, raw engine torque, magnetic heading, turbine speed, latitude, and longitude. According to the director of operations, the company had used the data in the past to evaluate unusual maintenance events. He stated that he thought the purpose of the monitoring was to make sure the aircraft were being operated in accordance with company policies and procedures such as cruise speeds and torque settings. They had planned to download the data; the DO stated it takes a long time “to download an audio file, and then I don't know what you'll do with it. Unless you are going to look for something that, okay, from this time to this time, what happened here? Yes, then that would be useful.”

### **4.5 Helicopter Shopping**

Helicopter shopping is a practice in which a medical facility contacts multiple helicopter operators until one is found that will accept a flight request. Regarding the accident flight, Holzer Meigs

Hospital contacted additional HAA operators after being notified by MedFlight that the flight was being refused due to weather concerns. When interviewed, the ERT was asked if she knew what the term “helicopter shopping” referred to and she said that she did not until reading news articles after the accident. She was also not aware of any policy prohibiting her from contacting multiple HAA operators and noted that contacting multiple operators was their standard practice if a flight was declined. She stated that they would always contact MedFlight first, because MedFlight was their primary provider for HAA services, and then usually would contact HealthNet next. Survival Flight was a relatively new operator in the area and the hospital had begun contacting them as well. When asked if operators provided reasons for refusing flights, she noted that they always tell her why a flight is refused, and if she contacts another HAA operator for the same flight, that information is passed on.

The weatherturndown.com website described itself as a free service allowing medical transport programs to share current information regarding delays or cancellations due to weather.

As mentioned above, 135.617 states that for the preflight risk analysis the operator must establish a procedure for determining whether another HAA operator has declined a flight request.

The OCS that was on duty at the time of the accident said that he was the OCC person that received the call from the requesting hospital stating, “I got the call. It was early morning hours, from Holzer Meigs ER in Pomeroy, and she wanted me to check weather for a flight going back up to Columbus.”

When asked if he was aware that the flight had been previously turned down by another operator he replied, “No. No. No, the sending facility didn't voice any turn downs. There was no weather turn downs that showed up in the website, and we actually have that linked into our CAD system, so those are real time when they enter them and get them, and there had been nothing for that area.”<sup>12</sup>

He clarified that the website he was referring to was weatherturndown.com. When asked if he normally asks requesters if the flight had been turned down by other operators he responded, “Sometimes I'll ask, you know, if conditions are -- or if it's a facility that's kind of out of our area, I'll ask them, has anybody else declined it, because we don't get calls from them a lot. But if they're forthcoming about that information, I do provide it to the pilot.”

Advisory Circular 135-14B stated in part: “HAA best practices suggest that the responsibilities of communications specialists should include ascertaining, from those requesting HAA services, whether another HAA operator has previously declined to carry out a particular flight and, if so, for what reason. The response received should be conveyed to the pilot performing the Risk Analysis in accordance with §135.617.”

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<sup>12</sup> CAD refers to computer aided dispatch

#### 4.6 “Reverse Helicopter Shopping”

During interviews of current and former Viking Aviation employees, some expressed concern that staff at the OCC were using the website weatherturndown.com to obtain flight requests for HAA flights that other operators had turned down due to weather. Several interviewees referred to this a “reverse helicopter shopping”.

One pilot noted that anytime he received a flight request for a flight outside of their normal program area he suspected that OCC was using weatherturndown.com to find flights. Another pilot expressed similar suspicions but noted that this practice by OCC would not affect how flight crews at his base would approach a flight request. One pilot stated, “they specifically told me, hey, we were looking at weather turndown and there's one that was turned down out of Pittsfield, Illinois, we were going to call that hospital and see if you wanted to take it.”

The staff at the Holzer Meigs Hospital were not aware of Survival Flight ever initiating contact for a flight.

#### 4.7 Night Vision Goggle Policy

The operator was authorized to use NVGs for night operations. Neither the regulations nor the operator’s GOM mandated availability of NVG during night flights. In the event that the NVG was inoperative, the flight was to be conducted under the unaided weather minimums. The GOM Volume 1 Section X: Helicopter Night Vision Goggle Operations (HNVGO), listed the night unaided weather minimums as follows:<sup>13</sup>

Table 2. Viking Aviation unaided ceiling and visibility requirements for Class G airspace

Non-Mountainous:		Mountainous (see 14 CFR 95):	
Ceiling - Visibility		Ceiling - Visibility	
Local:	1000 ft – 3 sm	Local:	1500 ft – 3 sm
Cross Country:	1000 ft – 5 sm	Cross Country:	1500 ft – 5 sm

In an interview with the director of safety and training, he stated that he expected pilots to take the NVGs with them on any night flight, “If it’s dark, take them.” He also stated that during training, “we teach we want them to have them on at night.”

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<sup>13</sup> GOM Volume 1 Section X.1.5 stated: “If either set of NVG display any of the disqualifying discrepancies, then the PIC will Log the issue on the NVG Maintenance Log and place the affected NVG Out of Service and HNVGO will not be conducted. The PIC will contact the OCC and inform all flights for that shift will be conducted Unaided. ... Flights will then be conducted as unaided and the unaided weather minimums will apply.”

When asked if it was a company requirement that pilots wear the NVGs all the time at night, the chief pilot responded “Yes.” No company policy regarding this requirement for the usage of NVGs was located in the GOM at the time of the accident.

Several pilots interviewed during the investigation stated that they would take the NVG on any night flight and most of the interviewed pilots stated that they were not required to take them. One pilot however stated: “I believe it is a requirement that we have them.”

#### **4.8 Preflight Risk Assessment Policy**

14 CFR 135.617 mandated the use of an FAA – approved preflight risk analysis stating:

- “(a) Each certificate holder conducting helicopter air ambulance operations must establish, and document in its operations manual, an FAA-approved preflight risk analysis that includes at least the following—*
- (1) Flight considerations, to include obstacles and terrain along the planned route of flight, landing zone conditions, and fuel requirements;*
  - (2) Human factors, such as crew fatigue, life events, and other stressors;*
  - (3) Weather, including departure, en route, destination, and forecasted;*
  - (4) A procedure for determining whether another helicopter air ambulance operator has refused or rejected a flight request; and*
  - (5) Strategies and procedures for mitigating identified risks, including procedures for obtaining and documenting approval of the certificate holder's management personnel to release a flight when a risk exceeds a level predetermined by the certificate holder.*
- (b) Each certificate holder must develop a preflight risk analysis worksheet to include, at a minimum, the items in paragraph (a) of this section.*
- (c) Prior to the first leg of each helicopter air ambulance operation, the pilot in command must conduct a preflight risk analysis and complete the preflight risk analysis worksheet in accordance with the certificate holder's FAA-approved procedures. The pilot in command must sign the preflight risk analysis worksheet and specify the date and time it was completed.*
- (d) The certificate holder must retain the original or a copy of each completed preflight risk analysis worksheet at a location specified in its operations manual for at least 90 days from the date of the operation.”*

Advisory Circular 135-14B stated that “operators should establish procedures for coordination between the pilot and OCS, or other person authorized to exercise operational control, to evaluate flight risk analyses to ensure risk is mitigated to the extent possible or a flight request is declined due to unacceptable risk.” The AC further states: “A PIC’s decision to decline, cancel, divert or terminate a flight overrides any decision by any and all other parties to accept or continue a flight.”

The GOM, Volume 1, Section T.10.1 stated that “The joint flight safety responsibility requires that at least one Operations Control Specialists, in addition to the pilot in command (PIC), is actively involved in reviewing the PIC risk analysis in accordance with the required risk analysis program. The OCS will continue to provide safety input to the conduct of the flight by monitoring factors affecting flight safety before and during the flight. The qualified OCS on the ground also provides

additional Crew Resource Management (CRM) support for pilots during high-workload situations or emergencies.”

The operator’s GOM, Volume 1, Appendix 3, the HAA base checklist, stated the following regarding the company preflight risk assessment (RA) policy:

*“At the beginning of the Operations Control Specialist shift, he or she will call each base of operation and get an Estimated Risk Assessment Level from the PIC that they have estimated will be for the entire shift. This estimated Risk Assessment Level will determine how the OCS conducts flight request. The Estimated Risk Assessment Level can be updated throughout the shift, for example, a Green RA and be changed to an Amber RA or any other combination the PIC determines.*

*When a flight request is received, the Operations Control Specialists will accept the flight only under an Estimated Green Risk Assessment Level. Under any other Risk Assessment Level, the OCS will initiate the flight after consultation with Pilot in Command. After the PIC accepts the flight, the OCS will fill out the Flight Risk Assessment Form 130.”*

The Operational Control Center supports preflight risk mitigation for flights that reach a predetermined level of risk as outlined in the VIKING Aviation Risk Assessment. The VIKING Aviation Risk Assessment was described as follows:

*“Flight Release Form 130 Risk assessment. Risk assessment Form 129 can be used to determine the Risk Level in a table form.*

*The purpose of this work sheet is to provide instructions for the completion of VIKING Aviation Form 130, the Risk Assessment. This form should be available at each base.*

*The four areas of concern on the form are:*

- 1. Environmental, current and forecast weather, all components to include ambient and cultural lighting.*
- 2. Aircraft status, both physical and documentation required for the flight and preflight planning.*
- 3. Personnel and Human Factors, specifically pilot's crew rest and compliance with the GOM and FAR's concerning crew rest, additionally personnel issues that involve all personnel on board.*
- 4. Flight type, the job, what we do.*

*There are 4 possible risk assessments:*

**Green:** *Normal conditions, the flight can proceed. The pilot would then request for a Green Flight Release (GFR).*

**Amber:** *One or more of the 4 areas of concerns is approaching an out of limits or unsafe condition. An Amber Flight Release does not require an approval*

*from Operational Control Management, but does require all possible risk mitigation strategies from both the PIC and OCS.*

*The pilot would then, request for an Amber Flight Release (AFR). The pilot would explain to the Operations Control Specialist (OCS) the reasons for the AFR request. This gives the OCS issuing the AFR the areas of concern and if possible, use any assets available to the OCS to bring the risk assessment back to green. If that process is not possible, i.e. poor weather, the OCS will issue an AFR with possible limitations or procedures to limit risk.*

***Amber Critical:*** *One or more of the 4 areas of concern is approaching an out of limits or unsafe condition within certain criteria. An Amber Critical Flight Release does require approval from an Operational Control Manager, and requires all possible risk mitigation strategies from both the PIC and OCS.*

*As the pilot works through the Risk Assessment form, he or she may discover conditions and/or issues that will require and Amber Critical Flight Release.*

*The pilot would then request for an Amber Critical Flight Release (ACFR). The pilot would explain to the Operations Control Specialist (OCS) the reasons for the ACFR request. This gives the OCS issuing the AFR the areas of concern and if possible, use any assets available to the OCS to mitigate the risk involved, if possible. If mitigation strategies cannot lower the risk to an Amber Flight Release criteria, the OCS will contact an Optional Control Manager and request approval for and Amber Critical Flight Release.*

*During an Amber Critical Flight, the OCS will continuously monitor the conditions along the flight and report in with the PIC every 15 minutes.*

***Red:*** *One or more of the 4 areas of concern is out of limits. The flight cannot happen under those conditions.*

*The Risk Assessment Form 130 will be filled out for each flight to mirror the PIC's Risk Assessment Form 130 at the Base.*

*The PIC and OCS will verbally confirm that Form 130 on both ends are completed.”*

The director of safety and training stated that Form 129 was a risk assessment worksheet which was used as guidance to fill out Form 130. He stated that Form 130 was the only record of a risk assessment being completed.

In an interview with the pilot that was going off duty when the accident flight request was received, he stated that the accident pilot would have filled out the risk assessment paperwork when she returned to the base after the flight since the request came in at shift change.

During interviews with current and former pilots regarding the risk mitigation procedures pilots commented:

“The problem I've always had with it is that operations control won't allow us to go red on weather, which even last night, I made the statement, I made the statement, well, I'm red, but you won't let me. I'll be amber, because, you know, half the United States was down for weather. But we're not allowed to be red. They won't accept it.”

“And I felt it was necessary to take the aircraft out of service so that way the mechanic wouldn't feel rushed to try and put everything back together if we did get a call. And so, what happened was the mechanic was called as to why the aircraft was out of service. He explained the situation. I called the OCM and explained the situation and they said that it wasn't necessary to take the aircraft out of service. It was necessary to put the aircraft on delay.”

“any place I've ever worked, the GOM is the bible. We do exactly what it says, and the flight releases -- you know, as simple as weather being below minimums and we're supposed to be red, here I'm calling them and I'm telling them hey, we're red. No, you're not, you guys are amber this evening. Well, no, we're red because it says right here the weather is below our day/night weather minimum... and they won't let you be red... this is just a microcosm of some of the issues.”

When the OCC manager was asked for a situation where she would deny a request by a pilot for flight while they were “amber-critical,” she stated, “I've never been asked it for an amber-critical flight release that I have not given. Now if the pilot is saying ‘hey, I don't feel comfortable’ or ‘I don't want to do this flight’ or anything, then I would say no.”

When asked if an OCS had the authority to override a pilot's decision to go based on factors that the OCS evaluated the OCC manager said, “[I]t's the pilot's decision always to take that flight... at that time if the OCS is or CS is concerned, they could always go out and call [myself] or [the director of operations] or any other OCM, but that it's always pilot call and I can't speak to ever seeing that.”

Further details on company restrictions on going out of service are discussed in Section 4.17.2.

When asked to describe operational control at the operator, the FAA principal operations inspector (POI) stated in an interview, “... you have a communications specialist and then you have an operational control specialist at the OCC who may receive a flight request. That notification goes out -- I'm not sure of the exact nature, but it goes out to the operational control manager, whoever is on duty at that time. And then their pilot is contacted, you know, to do their risk assessment, concur [sic] with the weather, do what they need to do. And then the flight is ... a go, then they launch. Then, you know, obviously the pilot in command has is supposed to have done everything they were supposed to do.”

When the POI was asked about the risk assessment process, he stated that there was an initial risk assessment with each shift change. Then once the communication specialist received a flight request, prior to each actual flight, they were supposed to then again conduct a risk assessment to “verify the different items” on the assessment and then were

“given a release number from the operational control specialist.” They would then be given a release number from the OCS. He was then asked about the risk assessment worksheet and if they were required to maintain the worksheet of just the end status such as green, amber, amber critical and red and he replied: “I think I'd have to look back and see if they were. I know the forms have to be completed and I know that the worksheets are kept, I believe, on a computer, but I'm not sure.” When asked about how he conducted oversight on the risk assessment process he said, “...each time I will go up, an example, for Batesville, I will go to the operational control center, and usually, you know, if they're not too busy, will go up there and they'll kind of run down all the bases with the different risk assessments, and I'll look at the paperwork and just kind of, you know, take a look at how the operation is going. From the outstation what I'm doing is, when I go to do an outstation inspection, no, I will start out and I will review all the paperwork and the risk assessments, not only from that shift but previous shifts, and, you know, just ensure that they're all filled out correctly on their form at the outstation, you know, what release numbers are there, that type of stuff.”

When the POI was asked if, from his knowledge of Viking's risk assessment, he believed it was adequate, he stated, “[y]eah, as it's documented, I believe it meets the advisory circular and the regulation.”

#### **4.9 Pilot Schedule, Duty, and Rest**

GOM Volume 1, Section S.11.1 stated:

*“Flight Crewmembers are required to be available for duty at all times except during required rest periods or scheduled vacations. No Crewmember will be scheduled so that his flight and duty time will exceed standards set forth in FAR 135.263 through 135.269, which are:*

*Time spent in transportation, not local in character, that Viking Aviation LLC requires of a flight crewmember and provides to transport the crewmember to an airport at which he is to serve on a flight as a crewmember, or from any airport at which he was relieved from duty to return to his home station, is not considered part of a rest period.*

*Viking Aviation LLC flight crewmembers will keep the Operations Control Specialist of their flight and duty time status. Flight crewmembers are required to refuse any assignment that conflicts with Part 135 Subpart F "Crewmember Flight Time and Duty Period Limitations and Rest Requirements". Such refusal will be accepted by company management personnel without threat of reprisal against the employee.”*

GOM guidance was consistent with 14 CFR 135.267:

*For Unscheduled One and Two Pilot Crews:*

- 1. Viking Aviation LLC may not assign any flight Crewmember, and no flight Crewmember may accept an assignment, for flight time as a member of a one or two pilot crew if that Crewmember's total flight time in all commercial flying will exceed
    - a. 500 hours in any calendar quarter;*
    - b. 800 hours in any two consecutive calendar quarters; or*
    - c. 1,400 hours in any calendar year.**
- 2. During any 24 consecutive hours the total flight time of the assigned flight when added to any other commercial flying by that flight Crewmember may not exceed:
    - a. 8 hours for a flight crew consisting of one pilot; or*
    - b. 10 hours for a flight crew consisting of two pilots qualified under this Part 135.**
- 3. Each assignment under paragraph #2 above must provide for at least 10 consecutive hours of rest during the 24 hour period that precedes the planned completion time of the assignment.*
- 4. When a flight Crewmember has exceeded the daily flight time limitations in this Section because of circumstances beyond the control of Viking Aviation LLC or flight Crewmember (such as adverse weather conditions), that flight Crewmember must have a rest period before being assigned to or accepting an assignment for flight time of at least
    - a. 11 consecutive hours of rest if the flight time limitation is exceeded by not more than 30 minutes.*
    - b. 12 consecutive hours of rest if the flight time limitation is exceeded by more than 30 minutes, but not more than 60 minutes; and*
    - c. 16 consecutive hours of rest if the flight time limitation is exceeded by more than 60 minutes.**
- 5. Viking Aviation LLC must provide each flight Crewmember at least 13 rest periods of at least 24 consecutive hours each in each calendar quarter. Though each pilot is ultimately responsible for his or her own rest schedule, Viking Aviation will discourage pilots from flying other commercial operations that would decrease their rest period and cause fatigue.*

The GOM stipulated that pilot flight and duty times were to be recorded on the company's "Pilot Flight & Duty Time Log". This log was to be reviewed monthly by the chief pilot. According to interviews of other current and former pilots for Viking Aviation, they would normally report for shifts before their scheduled start time in order to receive a briefing from the pilot going off-duty. The company records of pilot flight and duty reviewed during the investigation did not reflect this additional time for duty time calculations.<sup>14</sup>

When asked when a pilot's duty starts if a pilot arrives at their duty station early in order to do a handoff with the outgoing crew, the director of operations stated:

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<sup>14</sup> Base documented duty times can be found in Attachment 12 and company documented duty times can be found in Attachment 13.

*“were they required to be there? Yes, it starts when they're there. If they showed up because they want to show up, if they've showed up to say hi, they showed up to have a cup of coffee and they're not on duty -- but things happen. But they're -- yes, they write down when they should have been there. And that time will only vary by a few minutes. But they should put down when they got there.”*

When asked if pilots who come in early for a shift log that time in their duty log the chief pilot said: “Generally speaking, no. But, usually, I think the way they do that is if they come in a few minutes early, then they probably leave a few minutes early. So it ... isn't in that it's logged as a total time that they've worked; it's captured in that, but I don't know if they necessarily write down the specific times that they maybe start looking at weather or looking at the aircraft.” When asked hypothetically if he came in at 6:30 for a scheduled 7:00 start time and started getting ready to go, if his duty log would show a 6:30 or a 7:00 start time he answered: “Mine would say 7:00 to 7:00.”

One pilot, when asked if his shift began when he arrives early at his base in order to receive a shift change briefing, or at his scheduled shift start time responded, “Personally, I considered it as soon as I walked in the door. That's when my duty day began. The company's attitude was, no, it's not. So there was a point of contention right there.”

#### **4.10 Pilot Shift Change Procedures**

The GOM Volume 1 Section Z.4.1 provided the following guidance on shift changes:

*“Both PIC’s and AMP are expected to accomplish a shift change briefing at the time of shift change. Shift change briefings will discuss all of the following (but are not limited to):*

- 1) Aircraft Status (fuel levels, oxygen levels, maintenance, etc.)*
- 2) Anticipated/Scheduled Flights*
- 3) Safety Updates*
- 4) Schedule Changes*
- 5) Any other information that is deemed necessary”*

*“The PIC and AMP are expected to accomplish the following, within 60 minutes of assuming their duties:*

- 1) Conduct a shift briefing as soon as possible and document that briefing using Viking Aviation LLC Form 131*
  - a. Aircraft Status (fuel levels, oxygen levels, maintenance, etc.)*
  - b. Anticipated/Scheduled Flights*
  - c. Hazard Updates*
  - d. Schedule Changes*
  - e. Any Special Circumstances*
  - f. Any other information that is deemed necessary*
- 2) Conduct a Risk Assessment using Viking Aviation LLC Form 129*
- 3) Conduct an Aircraft Preflight Inspection using the Aircraft’s POH or approved checklist and document the preflight using VIKING Aviation, LCC Form M101 (PIC Duty) ... ”*

When asked about the accident pilot taking the accident flight right at shift change the director of operations stated, “In order for her to have taken the flight, she should have had access to all information possible. Weather should have been checked... to give four greens, that should happen. If you're not able to -- when you show up to work, if you have not completed the items required for you to take that flight, then the flight goes to the pilot before you; you do not take the flight.”

Pilots who were interviewed after the accident reported that they would arrive at their base between 10 and 15 minutes before their scheduled start time in order to receive a shift change briefing from the outgoing pilot. They described the normal briefings as including the items listed on the GOM. One pilot stated, “Oh, yeah. So you come in the door and check with the other pilot how they're doing, how was their shift, any flights. If there were, what happened. And we'd hand over the cell phone and hand over the aircraft log. Talk about the medical crew if they're the same, if they were changing. Talk about the weather. Talk about the aircraft, upcoming maintenance, anything coming due on maintenance in the future. Yeah, just -- and then we'd chitchat. Usually it took about 10 or 15 minutes at the most.”

Regarding flight requests that come in during a shift change, one pilot said “there has been cases where, you know, the oncoming pilot and the off-going pilot switch, you know, while the helicopter was running. You know, here's your brief and here's your book. You call OCC and make a pilot change, a crew change, and away you go... You're taking the previous flight, previous pilot's word” on preflight readiness.

During the accident flight request, the OCS had expected the evening pilot to take the flight request because it was time critical, “Well, I called the pilot. He accepted the flight. I told him it was a launch request, and he said, well, Jen's about 5 minutes out, and that she would be taking the flight. And I told him, okay, well, if you're going to do a pilot change, that's fine, but this is a launch request, so, you know, if it's going to cause a delay, maybe he should take the flight. I don't think I told him that, but that's kind of what I was insinuating, because he had plenty of time.”

## **4.11 Company policies on encounters with adverse weather**

### **4.11.1 Icing conditions**

At the time of the accident, Viking Aviation did not operate helicopters equipped for flight in known icing conditions, and helicopter flight in icing conditions was not authorized in the ops specs. The GOM Volume 1 Section S.4.4 stated “No Viking Aviation LLC helicopter will be operated in known icing conditions”. No guidance was found within the GOM or the Viking Aviation Bell 206 training manual for an inadvertent icing encounter.

The chief pilot stated that his expectation of a pilot encountering icing conditions would be to “[e]xit the icing environment, land as soon as possible, land immediately... that's one [of] those situations where ... the pilot in command has to make a decision what's the safest way out of this.”

The director of safety and training said that regarding icing, he discusses synoptic situations where icing could occur, including temperature and moisture factors. He said, "I cover that pretty intensely because the airplane and fixed wing pilots really go up to that training a lot, and I take a shortened version of that for the helicopter people because we're not supposed to be there in the first place." He further said that he would expect a helicopter pilot that encountered icing conditions to take "immediate action. A land, turn around, or do something different right now."

The director of operations said: "As far as flying in icing conditions, I'm not sure the concern because it doesn't happen. It's one of those things where it's a chapter 1 limitation, thou shalt not. Thou shalt not fly that helicopter in icing conditions. We're pretty serious about it... it doesn't do ice well."

One pilot stated "Should you encounter icing, turn around, do 180, go back to where you know there were known non-icing conditions. There's no way to de-ice inflight."

#### **4.11.2 Inadvertent IMC conditions**

The GOM Volume 1 Section M.8 provided the following guidance should a helicopter encounter inadvertent instrument meteorological conditions.

##### ***"Inadvertent Instrument Meteorological Conditions (IIMC)***

1. *Definition: unintended departure from VFR flight into IFR (instrument conditions)*
2. *Viking Aviation LLC helicopters are not currently IFR (IMC) capable. Entry into IMC conditions with the current aircraft would be considered an emergency condition. The best way to deal with IIMC is not to have it happen.*
  - a. *Check weather prior to departure, Enroute and at arrival.*
  - b. *Adhere to Op Spec A021 weather minimums.*
  - c. *Develop decision points for the route, and if changes occur be prepared with a plan of action to divert if necessary*
  - d. *Be aware signs of worsening weather. Ground references disappearing, flight visibility reduction, and/or cloud ceiling lowering. At night utilizing night vision goggles, be aware of "halos" forming around ground based lighting. This is signs of high moisture content and may lead to lowering visibilities.*
  - e. *Be aware of synoptic weather patterns that may lead to reduced visibility and/or lower cloud ceilings. Warm frontal boundaries may produce extensive areas of decreased visibility and lower cloud ceilings. High pressure centers may produce radiation fog. High ground moisture content may lead to fog formation.*
  - f. *Use routing to assist in maintaining VFR and establishing both ceiling height and visibility.*
3. *IIMC entry emergency checklist, there should be 2 checklists available, one for the PIC and one for the crew. The crew should be used to back up the PIC when using the checklist to reduce pilot workload. The four C's:*
  - a. *Control the aircraft*
    - (i) *Attitude, level the aircraft*

- (ii) *Heading maintain heading until there is a plan in place, only turn to avoid obstacles.*
  - (iii) *Power, adjust as necessary to climb or maintain altitude*
  - (iv) *Airspeed, adjust as necessary*
  - (v) *Minimize unnecessary control movements. Keep movements purposeful and smooth.*
- b. Climb or maintain altitude, obstacle dependent.**
- (i) *Proceed to a safe altitude to avoid obstacles*
  - (ii) *A climb may not be necessary, evaluate each situation.*
- c. Course; turn the aircraft towards VMC conditions.**
- (i) *Proceed to VFR with purpose and safety.*
  - (ii) *A reversal of course back to known VFR conditions may be the best choice. Continuing on into unforecast worsening weather may not be a good choice.*
  - (iii) *Have a plan, monitor weather, an informed choice is best.*
- d. Communicate:**
- (i) *Once IMC, contact ATC and declare an emergency, this will help with several issues, traffic avoidance being just one.*
  - (ii) *Be prepared to ask for the most suitable means to return to VFR. This could be an ILS approach if one is nearby, a GPS approach or vectors to VFR by ATC. Ask ATC for as much assistance as needed.*
  - (iii) *Have a plan, if crew is aboard; have them maintain contact with the Flight Follower. The OCC Personnel is an assist to be used as much as necessary.*
  - (iv) *If a diversion is necessary, have a crewmember contact the OCC Personnel for assistance with dealing with patient care.*
  - (v) *Involve the OCC Personnel as much as practical, however the OCC Personnel must be aware of the situation and not complicate the situation where updated information may not be practical to communicate, at the current time.*
- 4. Above all control the aircraft. The aircraft, in its current configuration, is not IFR capable due to some equipment and, especially, stability issues. Pilot workload under these conditions is significant. Use all of the tools available to secure a positive outcome of what is an emergency procedure. The Air Medical Personnel should be involved in the process. If weather is worsening, the PIC should advise them and they can assist in maintaining situational awareness. Example; the pilot is looking forward and considers conditions IMC, the medical crew may be able to view VFR conditions and advise the pilot. Be cautious of between layers VFR on top. Such conditions can be very distracting and continued instrument flight is advised.**
- 5. Once on an instrument approach, continue on the approach until VFR conditions can be maintained. Use the crew to assist in finding the ground environment.**
- 6. Once successfully landed and the flight details are completed, inform the Flight Follower to contact the Operational Control Manager on duty.”**

The Viking Aviation Bell 206 training manual listed inadvertent IMC as a task in the Instrument Procedures training phase. The training description for this task was:

*“The event should reflect a realistic course of action the pilot might take to escape from an encounter with inadvertent instrument meteorological conditions (IMC). Training and checking must provide emphasis on avoidance of inadvertent instrument flight rules (!FR), including the discipline and decision making required to divert, make a precautionary landing, or make an emergency transition to !FR, as appropriate to the circumstances. This event must include attitude instrument flying, recovery from unusual attitudes, navigation, air traffic control (ATC) communications, and at least one instrument approach. If equipped and available, an ILS approach is preferred. A GPS approach will satisfy the requirement also. If neither an ILS nor GPS procedures can be performed, another instrument approach must be performed. Partial panel operations should be considered if attitude and gyroscopic heading information are available from single sources.”*

Training records did not explicitly indicate completion of IIMC training, but showed that the accident pilot had completed the instrument procedures training phase on April 27, 2018. The Airman Competency/Proficiency Check dated April 27, 2018 did not list IIMC recovery explicitly as a maneuver that was performed, but it did indicate satisfactory completion of one GPS instrument approach procedure, and noted satisfactory completion of: unusual attitude recovery, flat light, brownout and whiteout recovery training, NVG PIC check, and simulated NVG failure.

The director of safety and training stated the IIMC training is “done mostly at night, view limiting device with the NVGs off, and they have to prove to me that they can get this done.”

#### **4.12 Crew resource management training**

Survival Flight’s crew resource management (CRM) training was conducted for pilots during indoctrination training and recurrent training. The director of safety and training used two presentations on CRM: one presentation was a basic overview of CRM and the other presented real life accident scenarios and lessons learned. The 45-slide overview presentation included the following topics:

- building and maintaining a team
- workload and time management
- decision making, memory, and motor programs
- human error, reliability, and error management
- fatigue management
- stress causes, symptoms and management,
- time pressure and deadlines
- single pilot resource management
  - communication
  - health

- workload management
- error management
- decision making
- situational awareness
- commercial pressures

Pilots, medical crew, OCC all received the same CRM ground training modules. The director of safety and training stated that despite medical crew being not considered crew members, they did use them as resources such as for abiding by sterile cockpit into landing zones, see and avoid, and NVG operation. “We also do CRM in our IIMC training, you know, we say look, you know, if you get a hysterical type pilot the best thing you can do is calm the situation.” He said, for medical crews, he tried to put himself in their point of view from the back “What can you do to assist a pilot? What can you do to gather information of the OCC as well because they have radio communications as well?” They did not typically do joint CRM training with OCC, medical crew, and pilots.

#### 4.13 Engine overtorque – indications and expected pilot response

The Section 3-10 of the Bell 407 manufacturer’s rotorcraft flight manual described the indication to pilots when an engine overtorque occurs and the corresponding pilot response to correct. Caution alerts were displayed in amber while advisory alerts were displayed with white/green lights.

PANEL WORDING	FAULT CONDITION	CORRECTIVE ACTION
CHECK INSTR	TRQ, MGT, or NG is about to or has detected an exceedance. Flashing LCD trend arc and digital display indicates impending exceedance. Letter E in digital display indicates an exceedance has occurred.	Reduce engine power if possible. Press INSTR CHK button to display magnitude of exceedance. Refer to BHT-407-MD-1.

Figure 2. Caution and advisory lights (reproduced from the Bell 407 rotorcraft flight manual).

#### 4.14 Helicopter Terrain Awareness Warning System (HTAWS) – indications and expected pilot response

The accident aircraft was equipped with a Garmin 650 Helicopter Terrain Awareness Warning System (HTAWS). This system provided spatial terrain awareness information on the terrain page of the Garmin 650 in addition to alerting aurally and visually when terrain or obstacles are predicted to be a hazard for the aircraft.

The system’s Forward Looking Terrain Awareness (FLTA) provided two levels of alert. A caution alert was designed to provide a 30 second lookahead and a warning was designed to provide a 15

second lookahead for potential impact. The actual time to alert varied with conditions and could be less than the design look ahead times.

Table 3. Display of HTAWS alerts (adapted from (Garmin, 2011)).

	If the G650 display is set to the terrain page, the following annunciation appears on the lower left corner of the display	If the G650 display is not set to the terrain page, the following pop-up appears where selecting ENT will change the display to the terrain page	Aural alert
Caution Terrain Alert			“Caution – Terrain, Terrain.”
Warning Terrain Alert			“Warning – Terrain, Terrain.”

The HTAWS is also capable of making altitude callouts between 0 and 500 ft. A check airmen for the company stated that most pilots set callouts for 200 feet and above. Normal practice within the company was for G650 terrain information to be fed to the GPS500 and displayed on the right panel of the GPS 500. Company training for HTAWS involved looking outside to visually acquire the hazard, taking action to avoid the hazard, and then silencing the alert.

#### 4.15 Previous company flights

##### 4.15.1 Pilot’s prior flights

The accident flight was the pilot’s first trip to Holzer Meigs Hospital, located about 70 nm southeast of Columbus. Since October 2018, the pilot had flown twice to a destination about 30 nm to the west of Holzer Meigs Hospital, Holzer Jackson Hospital: November 12 and January 24. The flight on January 24, 5 days prior to the accident, was between Grove City, Holzer Jackson Hospital, and Ohio State University in night VMC conditions. The accident destination required a more southeasterly route compared to Holzer Jackson Hospital and was flown about an altitude of 1500 ft msl, 500 feet above ground level.<sup>15</sup>

<sup>15</sup> See weather factual in the docket of this investigation for more weather information around this flight.

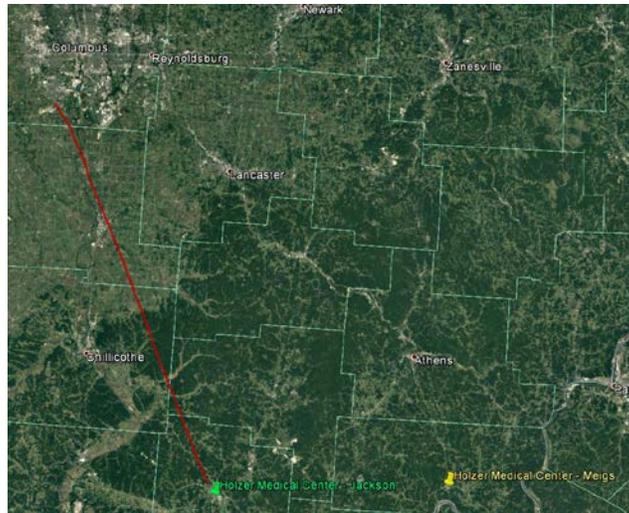


Figure 3. Flight track of accident pilot’s flight to Holzer Jackson Hospital on January 24, 2019.

Witnesses at the base stated that the accident pilot had had a discussion with the vice president of EMS services the day prior to the accident regarding the expanse of hilly terrain in southeast Ohio. In the three months prior to the accident, the accident pilot had consistently written comments on weather and precipitation on shift briefing/debriefing paperwork. Shift briefing/debriefing paperwork also indicated that 3 days prior to the accident, she had made a decision to abort a flight due to isolated weather along their route.

The pilot on shift prior to the accident pilot said “knowing who she is, I am certain that once she got off the phone with me, if she wasn’t looking at weather already, she was certainly checking it .... She would fly with an iPad on her knee. She had ForeFlight on it giving her weather ... as well. That was her standard operations.... So I feel pretty confident that she would have seen the weather herself, and she was our safety officer. She was very conservative when it came to flying. She wouldn’t push weather at all. If she felt like it wasn’t a safe flight to take, she absolutely wouldn’t have taken it.”

#### 4.15.2 Company operation in snow conditions

A dispatcher stated the following regarding the presence of snow during the accident time frame: “There was some light snow reporting on some of the METAR sites, but nothing that seemed alarming... nothing that would stand out to me.” All but one of the pilots interviewed stated that flying through snow was acceptable as long as minimum visibility was maintained. The other interviewed pilot stated that there was a difference between “heavy moist snow” that could start to accumulate on the aircraft compared to “light powdery” snow that would not typically accumulate that would factor into his decision.

When provided a situation where pilots received information on marginal VFR with potential for icing in the clouds and snow showers and asked whether he considered that a flight his pilots could take, the director of safety and training said “I would. If we don’t get in it, ... we shouldn’t have

icing. ... you read the fine print. It says only applicable in visible moisture.” He said that the areas of icing probability are so expansive, if they did use icing probability to make go/no go decisions, they “would never fly.”

Evidence suggested multiple cases where pilots encountered snow in flight and continued to fly citing that a minimal visibility was maintained. A former paramedic for the company described a flight conducted on January 14, 2019 by the base lead pilot: “... we ended up meeting a wall of snow. ... we got further into the snow and then I lost contact -- out of the left side, I lost contact with the ... lights below me... What happened next is that [the pilot] continued to go almost in a straight pattern towards the weather, but not aborting...”<sup>16</sup>

The company’s shift briefing/debriefing forms for base 14 also indicated that the base lead pilot had encountered snow inflight on at least four other occasions in the 2 months prior to the accident.<sup>17</sup> Excerpts from these forms are provided below:

- December 6, 2018 “Wx enroute reporting VFR, Ran into falling snow at Ross Co Line upon reaching Hill terrain east of Chillicothe, reached out to OCC, turned west to attempt to go around and ran into haze with precipitation (mild) 4 sm vis. Aborted, headed to Bolton for fuel.”
- January 10, 2019: “Mild snow squall, vis greater than 4 miles, 25 mi N of hospital”
- January 10, 2019: “Snow avoidance in flight, vis 4 mile”
- January 15, 2019: “Visibility dropped in flight. Less than 3 SM. Rime ice formation on bottom of windscreen along window molding. Aborted returned to base. Conditions NOT as reported.”

The company’s chief pilot also relayed a situation where he encountered snow during a flight after the accident. “There is nothing on the radar, but, yet, here I am flying in snow... I could still maintain visibility because it wasn’t snowing that hard.”

#### **4.15.3 Base 14 lead pilot flights**

The lead pilot of SF 14 had been with the company since April 2018 and had been lead pilot for the base since August 2018. There had been several concerns brought up to management about his decision making.

During a visit by the director of safety and training to the Ohio bases in December 2018, multiple concerns were brought up by the medical crew and base safety officer (the accident pilot) regarding the conduct of the lead pilot. Several of the concerns were documented in a letter to human resources dated December 13, 2019 from the accident nurse.<sup>18</sup>

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<sup>16</sup> The pilot’s shift briefing/debriefing remarks stated the following regarding the flight: “South return flight, Mansfield 5sm, 500,1 BJJ, 10sm 012, encountered IMC (60 sec inflight) conditions passing BJJ, turned north to resume vis, proceeded west to ST8 Rt 71 with MFD flight following, flew south over 171, 5-7 vis, 20 miles north CMH, clear 10sm, MTCW<sup>16</sup> – Cleveland”

<sup>17</sup> Base 14 shift briefing/debriefing forms can be found in Attachment 5

<sup>18</sup> Refer to Attachment 4 for accident nurse’s letter to HR

- Flight A1: The letter detailed an event where a flight had been declined by their sister base (SF13) for low ceilings and weather but was accepted by SF14. When the nurse expressed concern about bad weather, the lead pilot assured they could conduct the flight “if they hurried.” During flight, the visibility deteriorated, and the nurse expressed concern three more times, however the pilot continued until all visibility was lost.
- Flight A2: Another event detailed in the letter discussed a flight where the lead pilot could not use his NVGs and requested the paramedic use his NVGs to talk him through the flight at night over high terrain. The paramedic was uncomfortable with this request because of the limited view he had from his seat. When the nurse looked out the window she only saw “black and a ton of clouds and precipitation.”
- Flight A3: Another event mentioned in the letter relates to a flight to Holzer Jackson Hospital. The nurse had noticed “a large area of gray and blue” on the weather map, however when she asked the lead pilot about the weather, he stated it was “all clear” and that they needed to get going. She and the paramedic noted thick snow falling during the flight and the pilot asked the paramedic to use her NVGs to look outside since he could not see through the heavy snowfall with his NVGs. Both the nurse and the paramedic continued to report deteriorating visibility until they could no longer see features outside. After the crew had agreed to abort the flight, the pilot continued to fly towards the destination rather than returning to base. They then decided to land at an airport in sight and wait for the weather to pass, however after approaching the runway, the pilot climbed again and continued the flight to Grove City. The crew debriefed the flight where the medical crew stated that “other than the weather getting extremely bad and hitting IFR, it went well.” The lead pilot agreed, however the following day, the nurse was confronted by her supervisor who said that the pilot had told her that he believed they could have made the flight but that the paramedic became upset and they had to turn around.<sup>19</sup> After reviewing the pilots’ input into the shift briefing/debriefing form, the medical crew refused to sign because the pilot had input that there were “no issues” with the flight despite their conversation the day prior about the issues.<sup>20</sup>

Upon review of the shift briefing/debriefing paperwork and flight track, a flight conducted on December 6, 2018 was consistent with the description in this incident.<sup>21</sup> The flight track and altitude above ground level is presented below:

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<sup>19</sup> During an interview, the base lead pilot provided this flight as an example where he believed the flight could be conducted, but the medical crew’s concerns drove the decision to abort.

<sup>20</sup> Refer to Attachment 5 for SF14 shift briefing/debriefing forms

<sup>21</sup> See weather factual in the docket of this investigation for more weather information around this flight.

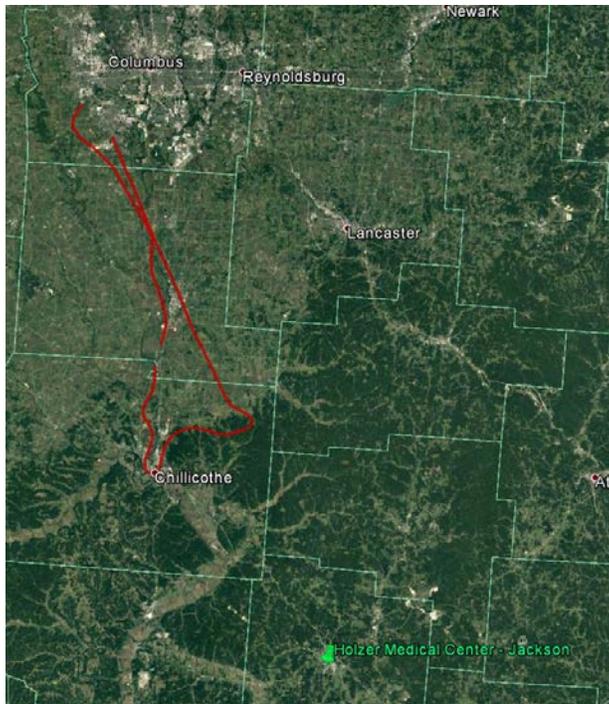


Figure 4. Flight track of base 14 lead pilot flight on December 6, 2018.

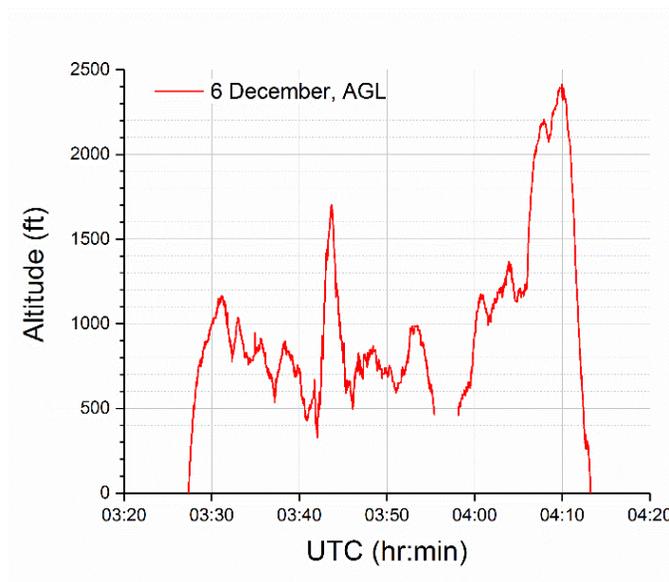


Figure 5. Altitude (agl) profile for base 14 lead pilot flight on December 6, 2018

The letter referenced another flight with the base lead pilot and another survival flight paramedic. The following account was described during interviews of the paramedic and the base lead pilot on the flight.

- Flight A4: During a flight from Cleveland to Columbus, the flight encountered heavy fog and reduced visibility. During preflight, the pilot had noted that there was an area reporting below weather minimums between Cleveland and Columbus. The medical crew voiced concerns about low visibility during the flight. The paramedic stated that they “became engulfed in it ... it was a complete whiteout. We lost sight of the ground. We lost sight of everything.” The pilot verbalized that he was beginning a standard rate turn and they exited IMC conditions about a minute later. After approaching a town that was in VMC conditions, the crew began brainstorming where they could land the helicopter to wait out the weather. Instead of landing, the pilot elected to use Mansfield airport tower to guide them to the highway. The paramedic stated that “...once we left ... the town -- -- then we went straight back into marginal conditions...” After intercepting Interstate 71, they flew south along the highway towards Columbus. Upon hearing that another aircraft reported clear conditions at 1000 feet, the paramedic said that they “essentially left from following the middle of the highway, ..., being able to see the highway. We rose through the clouds until we lost visibility with the ground” According to the paramedic, the flight descended back down to follow the highway. They then landed at CMH for fuel.

Upon review of the shift briefing/debriefing paperwork and flight track, a flight conducted on January 14, 2019 was consistent with the description in this incident.<sup>22</sup> The flight track and altitude above ground level is presented below:

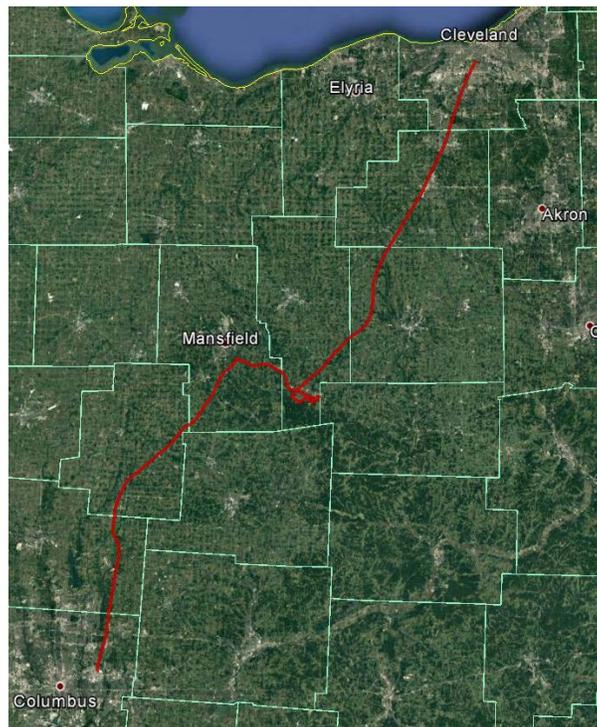


Figure 6. Flight track of base 14 lead pilot flight on January 14, 2019.

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<sup>22</sup> See weather factual in the docket of this investigation for more weather information around this flight.

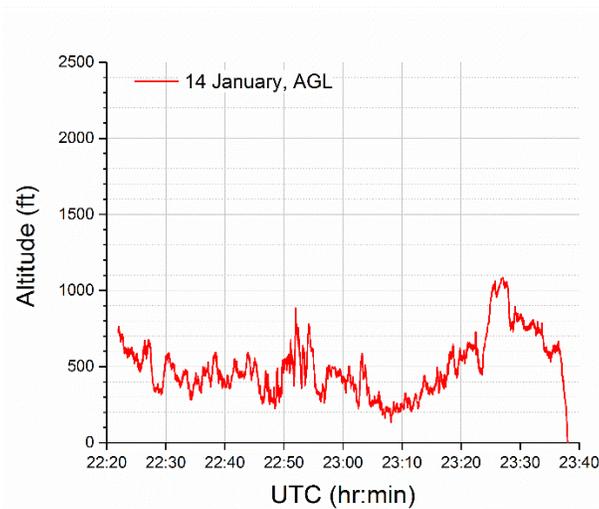


Figure 7. Altitude (agl) profile for base 14 lead pilot flight on January 14, 2019.

#### 4.15.4 Other company flights in month prior to accident

On January 12, 2019, the base lead pilot documented the following on the company shift briefing/debriefing form regarding a flight to Holzer Gallipolis Hospital. “In Route Vis deteriorated over the hills of southern oh, visibility dropped below 3 mi southbound, turned east direct HAG. University Athens uni reporting 7sm, OV -13, 00/00 A3014, customer requested patient to be flown to Huntington, KHTS reporting 1 ¾ mile 300 ovc, declined to fly to Huntington, hospital then declined flight. Turned north return to TZR – Base.”

On January 16, 2019, another base pilot stated the following on the company shift briefing/debriefing form, “Vis dropped to 1.5 – 2nm, landed at grove city and transport by ground”

On January 26, 2019 the same base pilot stated the following on the company shift briefing/debriefing form regarding a flight between Mansfield, OH and Columbus, OH, “WX lower than reported, turned around due to low ceilings”

#### 4.16 Safety program

The company’s GOM, Volume 1, Sections A, Y.1, and Y.2.4 stated the following regarding safety responsibility during flight.

- *“The Pilot-in-Command is ultimately responsible for the safety of his passengers and crew”*
- *“The flight personnel’s first concern is the safety of the flight. All HAA operations will be conducted with the highest degree of concern for the patients’ wellbeing. The flight personnel will cooperate fully with the medical personnel and comply with all requests that are consistent with the safe operation of the aircraft.”*

- *“The Pilot-in-Command (PIC) HAA is primarily responsible for the successful completion of every assigned flight and effective coordination with assigned personnel. This must be accomplished with overall flight safety as the dominant concern. This includes, but is not limited to ensuring that:*
  1. *The aircraft configuration is suitable to air medical personnel needs.*
  2. *The medical oxygen system is serviced to the medical personnel requirements.*
  3. *The air medical personnel are briefed on the flight operation or limitation(s), which may affect patient care or handling.*
  4. *There is communication between the PIC and the air medical personnel (AMP) prior to and during the flight as to the patient's needs (i.e. cabin altitude, rapid acceleration, deceleration, etc.)*
  5. *Patient and passenger movement around the aircraft during boarding and deplaning is coordinated.*
  6. *The standard passenger briefing (per GOM and 14 CFR Part 135.117) is given with special consideration for patient needs in an emergency. Conduct a standard Form 131 shift briefing and record it.*
  7. *The patient is safely and securely restrained via standard or approved methods.*
  8. *There is coordination of departure and arrival times with base operations, ground personnel and ground ambulances via telephone and/or radio communications.*
  9. *The PIC is not involved with patient care except for boarding and exiting the aircraft.*
  10. *Proper normal safety precautions and operational procedures during in-flight medical emergencies will be followed, assuming the safety of all personnel.*
  11. *Operational control of the flight is being maintained while adapting to changes required by air medical personnel that might have an impact on their job function and patient care.*
  12. *There is communication, by any means available, when there is necessary information for the air medical personnel that might have an impact on their job function.*
  13. *The AMP will ensure complete and proper disposal of hazardous medical waste and decontamination of the aircraft (Protection and Control of Infectious Conditions).”*

The chief pilot stated that “safety is, first and foremost, the most important thing in this company.” The director of operations stated that the intent of the safety program was to have a safety representative at each base that was from Viking who would run the program from “an SMS<sup>23</sup> point of view” where the medical side could participate but they would not be the “safety driver.” He continued that “the safety program varies from base to base. Sometimes it's very robust, other times people are not as willing to participate. It's really personality driven. If you've got a strong safety person there, it functions a little better than somebody who's not as interested.”

#### **4.16.1 Safety personnel**

The director of safety and training had held the position for 1.5 years. He was responsible for training and coordinating all safety programs implemented for the company. He reported to the

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<sup>23</sup> Safety management system

director of operations whose safety responsibilities included promoting and enforcing safety practices and supervising safety and training programs through the director of safety and training. A safety coordinator position existed to support the director of safety and training but was unfilled at the time of the accident. One of the director of safety and training's responsibilities included overseeing the safety representatives at each base. Section 1.5 of the operator's safety manual described the responsibilities for base safety representatives:

- *“Act as the Safety Coordinator’s representative at the respective base.*
- *Fulfill base safety training and record-keeping requirements.*
- *Advise base management on safety-related issues.*
- *Disseminate urgent and routine safety information to base personnel.*
- *Respond to the safety concerns of base personnel and forward concerns to the Safety Coordinator.*
- *Assist the Safety Coordinator in conducting periodic Safety Assessments.*
- *Analyze identified hazards for the purpose of eliminating or mitigating risk to VA personnel.*
- *Maintain a base safety bulletin board highlighting pertinent safety topics.*
- *Collect Hazard/Incident Reports and forward to the Safety Coordinator.*
- *Collect Safety concern minutes from any base meetings held.*
- *Conduct the base level safety committee meetings.”*

#### **4.16.2 Safety reporting process**

Section 4.3 of the safety manual stated the following regarding reporting of safety issues:

*“A Hazard/Incident Report or Viking Aviation LLC Incident Report shall be submitted when any situation, practice, procedure, or process is observed which is either:*

- *A recognized safety concern;*
- *considered unusual from an operational or procedural standpoint, or*
- *considered deficient from a safety standpoint, and*
- *Which, in the submitter's opinion, possesses a foreseeable potential for injury or illness to persons or damage or loss of property if not addressed in a timely manner.”*

The director of training and safety indicated that he would expect to see any encounter with inadvertent IMC reported to him via hazard and incident reports.<sup>24</sup> He had only received one incident report in the 1.5 years he's been in the position; this report did not involve the Ohio bases. The safety manual lists the following examples as mandatory reportable events, which however did not include an encounter with inadvertent IMC:

*“4. Any deviation from established laws, regulations, limitations, procedures, or practices by VA personnel while performing employment-related duties...”*

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<sup>24</sup> The company hazard and incident report form can be found in Attachment 6.

5. An event, which indicates a deficiency or an inadequacy in operating procedures or safety controls or equipment...

12. When any of the following events occur during operation of VA aircraft:

- ...Any instance of inadequate terrain separation to include any GPWS alert;...
- Any approach which is continued below published weather landing minimums;...
- Any encounter with severe turbulence or severe icing;...
- Any operation of an aircraft outside of designed operating limitations...”

Section 4.2 of the company safety manual stated the following:

*“All communications made by employees pursuant to the reporting process shall be made with the assurance that no retaliation/reprisal shall occur to the employee for submitting any information via the Hazard and Incident Reporting System.”*

#### **4.16.3 Safety process**

The chief pilot stated that if anyone had a safety issue, they would report it to their base safety representative first. The safety representative would attempt to solve the issue at their level, and report to the director of safety and training if they were unable to resolve it. The director of safety and training would then attempt a solution himself or coordinate with the chief pilot or the director of operations. The chief pilot also stated that safety issues did not need to be reported through the chain of command for resolution.

The director of safety and training said that he, the chief pilot, or director of operations can receive safety concerns through emails or phone calls and added that it was “an open top safety program.” He stated that there is also an email address at each base crews can use which is monitored by the safety representative at each base and forwarded to him as they desire. He stated that if there is an immediate safety action that should be taken, people can call anyone in management.

When asked how medical crew report safety concerns, the director of operations stated “they’ll take it either to their base manager or they may take it to the lead pilot or however that works.” The chief pilot suggested that they would use their debriefing form (Form 131) where crews can document “whatever [they] feel like[they] want more education on, or a concern from any flight. You write that stuff down and we all actually have to sign [it] after each flight.” It’s filled out by the pilot, medic, and nurse that returns from each flight. He continued to say “if something is so serious on safety that they don’t want to fly any more they don’t have to. There’s actually a box on [the debriefing form] to contact their supervisor, and we’ll go out of service, and figure this out.” The chief pilot stated that when he visited bases he reviews the debriefing forms to ensure a safety topic was annotated and address those issues as needed.

There were mandatory pilot meetings every Wednesday where safety topics can be covered. The director of training and safety said that he sends out safety bulletins throughout the year with various safety topics to post on each base’s safety board. The bulletin board also posted the incident

reporting procedure, the director of safety and training's email address, and safety email address for each base.

Section 4.4 of the company safety manual stated that:

*“Upon receipt of a Hazard/Incident Report, the Safety Coordinator will conduct an investigation to determine the validity of the report as well as to gain additional information concerning the report's subject matter. Any hazardous situations or equipment shall be either placarded or removed from service until the hazardous situation is corrected. The submitter, if identified, will be advised of the result of the investigation. If a Hazard/Incident Report identifies a problem that is outside the scope or authority of the Safety Program, the originator will be offered assistance in routing the information to the appropriate person responsible.”*

#### **4.17 Safety culture**

During discussions to develop a safety program, the director of safety and training said that when evaluating increasing weather minimums as suggested by the CAMTS<sup>25</sup> guidance, management concluded that since “[they’ve] been operating successfully, why change to somebody else’s standards?”

Several former employees had stated that they received multiple texts from current company pilots and med crew stating they were “scared to fly.” One nurse stated that she believed the pilots were safe but the company (administration and management) were unsafe. Several pilots highlighted a lack of transparency by the company on safety issues.

The director of safety and training described his correspondence with the DO regarding safety issues and resolutions: “I bring all these things up to him. And ultimately, I work directly for him, and I carry out his philosophy and, ... his way of doing things. And so, I mention these things to him, and if it's something that he may want to change, then, ... he allows me to maybe discuss it with him, but that's as far as it goes.”

##### **4.17.1 Pressure to attempt flights**

A pilot that had relocated to open the Columbus bases said there was “an awful push to get numbers ... it was like they created an environment that felt like a competition, especially when [base] 14 opened up.” He stated that the vice president (VP) of emergency medical service (EMS) stated their flight volume was going to be 150 flights a month, where this pilot considered 30-35 flights per month to be realistically achievable in the new environment. Company management motivated bases to conduct flights by purchasing a massage chair for the base if they flew 30 flights in one calendar month. The count of flights per month was kept on the safety board in the SF14 base. According to the company’s monthly summary, the accident flight was the 26<sup>th</sup> flight the base would have completed in January.

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<sup>25</sup> Commission on Accreditation of Medical Transport Systems

#### 4.17.1.1. Survival Flight “Quick Reference Guide”

Survival Flight had developed a “quick reference guide” shown in Figure 8 that was distributed to hospitals and fire departments. The clinical base manager for SF13 stated that she developed the card in an effort to aid in public relations, highlight survival flight services, and facilitate patient transfers. When asked about Item 5 in the list that stated “Our weather minimums are different, if other companies turn down the flight for weather – CALL US. If we can fly to you safely and take the patient safely to another facility...WE WILL,” she said that it was her understanding that they operated at minimum FAA weather standards while other companies had raised their minimums, and therefore that allowed them to take flights when other companies could not.

After developing this card, she received approval from the VP of EMS Services, and it was sent to the public relations (PR) and marketing manager for approval. When asked about the card, the PR and marketing manager who was OCC manager at the time of the interview, stated that the first time she had seen the card was on social media after the accident.

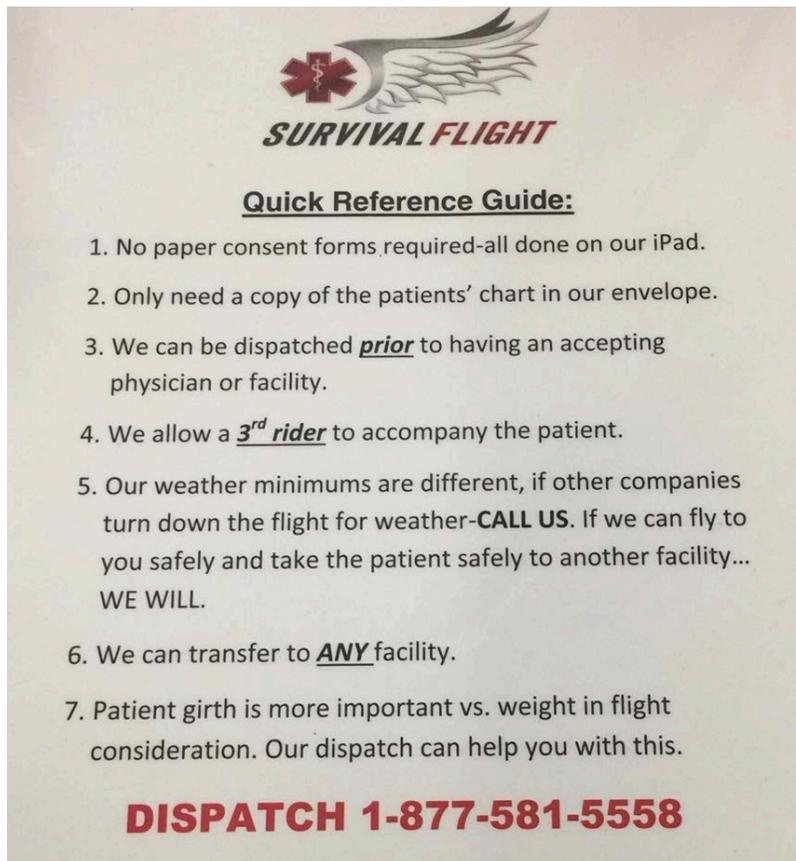


Figure 8. Survival flight “Quick Reference Guide.”

#### **4.17.1.2. Dissemination of patient information**

Multiple dispatchers, pilots, and medical crew stated that pilots never receive information on patient status before or during a flight. However, OCC recordings indicate the accident pilot requesting and receiving patient information about the time the aircraft departed. Section Y-10-5 of the GOM Volume 1 stated that “The PIC will accept or decline the flight based on aviation criteria only. Medical factors will not be made available to the PIC until the flight is accepted.”

#### **4.17.1.3. Expected launch time**

Pilots and medical crew stated that the company management wanted pilots to be off the pad within 7 minutes of getting a call for a flight. If the aircraft was not off the ground in 7 minutes, pilots were expected to fill out an “occurrence log” to explain to the DO why they didn’t lift off within 7 minutes.

While pilots stated that 7 minutes was “doable” if everything went “smoothly,” several pilots stated that 8-9 minutes was more realistic and highlighted concern with this expectation as the walk to the pad could take upwards of several minutes and would not include time for the 2 minute engine warmup during the winter. In one case, a pilot was confronted by the base lead pilot for waiting on the pad until all engine temperature gauges were in the green. The lead pilot had told him that there was nothing in the rotorcraft flight manual (RFM) that said to wait for the temperatures to go green and continued that the director of operations had concurred with his (the lead pilot’s) position. In response, the pilot conferred with other line pilots who told him to “just ignore [the lead pilot] and put in a request to ops to include a delay for ... engine warmup.”

#### **4.17.1.4. Pressure from management to accept flights**

One pilot stated that the chief pilot “says all the time ‘you know there’s safe weather, there’s legal weather but you need to have both in order to complete the flight.’ And on top of that he will tell you all the time that nobody has turned down more flights at the company than he has. So, he’s not going to pressure anybody to take a flight and he’s not going to question their decision to turn down a flight.” However, there were numerous company personnel who witnessed people in management, including the chief pilot, pressuring pilots to accept flights. One pilot described a situation where a pilot had reported to the OCM that he was concerned he was too fatigued to take another flight after flying three already. In this case, the chief pilot, who was OCM at the time, convinced the pilot to accept the flight. The pilot who was interviewed expressed concern about management pressure stating a pilot had already reported that he was tired “but they try to talk you through it and say hey, ... maybe drink a cup of coffee before you go ... and try to get it done.”

However, numerous pilots and medical crew indicated incidents where they were the recipient of or witnessed a pilot being reprimanded or challenged for declining a flight. One medical crewmember said, “the chief pilot of the company... would call within about 10 minutes and would cuss out our pilots and belittle them, ... saying, ... we need to take these flights,.... he would yell so loud on the phone that you could hear it, ... just standing within earshot.” He continued to say

that the chief pilot told the pilot that if the base failed, it would be his fault because he was turning down flights.

The director of safety and training stated that several pilots informed him that they were getting reprimands from an operational control manager, specifically the chief pilot. The director of safety and training said that “we don't need to be pushing people past their comfort level. If they assessed that, and they're the pilot, they need to have the final say.”

Another example involved a pilot denying a flight for high winds (35 knots gusting 50 knots) and low ceilings. He had received a call from the chief pilot questioning his decision who stated that he was not seeing the same weather from his location. According to the pilots and witness testimony, he immediately received a call from the director of operations who stated that the aircraft could handle the reported winds. When the DO learned that a medical crewmember was not comfortable, he confronted her “what is this I hear about you not wanting to fly?” She said she explained that it's not about her not wanting to fly, it was about not wanting to fly this flight after the pilot had already turned it down twice. She further said she didn't appreciate the pressure he was putting on the crew, and that it shouldn't happen even after the pilot had said no once. After this conversation, the DO told the pilot to take the flight “or at least try it. If he had to turn around then so be it”

Another pilot described an instance where he received pressure from the OCM to fly an aircraft in poor weather because she “wanted that helicopter back on that helipad for the visual effect.” The pilot stated that once the ceilings rose to minimums, he “got a call from [the OCC manager]. And she didn't ask; she demanded that I get that helicopter flown back to [the hospital].” After the pilot refused because the field was under IFR, she assured him that because the ceilings were 800 feet, he could fly.

In addition to reprimands by the upper management, other employees were experiencing fallout from their base lead pilots as well. The accident nurse stated in her letter to HR that multiple individuals in both Ohio bases had experienced “unsafe flights with [the base 14 lead pilot] and ... when we have to abort a flight with [the lead pilot], we get talked to by management, get questioned, and we are always made to look like we are just lazy and don't want to do it.” This was consistent with statements made by interviewed other medical crewmembers as well. After a particular encounter with IMC conditions and voicing concerns, one paramedic was told by her supervisor at the base to “keep quiet, put [her] head down, and don't say anything.”

In another case, a pilot declined a flight into St. Louis for gusting winds. The base lead pilot confronted him about the declined flight. After the pilot explained how the aircraft did not handle very well in gusty conditions in the city, the lead pilot stated that they had “no wind limitations” and said that he had “never seen a pilot turn down a flight for wind.” The pilot who had turned down the flight spoke with another base pilot who took the flight to St. Louis that same day who said that he had encountered trouble with the winds and “would never do that again.”

In another case, a pilot declined a flight for instrument conditions. The lead pilot confronted him about why the pilot declined and said that the reporting station that was indicating IFR was faulty and that the pilot should have attempted the flight.

Multiple former employees felt that their decisions to voice concerns and deny flights they felt were unsafe played a part in their terminations which occurred shortly afterward. Several former pilots for Survival Flight expressed safety concerns about the operation, however felt that people in the company currently could be reluctant to speak up since they would be “worried for their jobs.”

#### **4.17.2 Bases not allowed to go out of service**

Several current and former pilots relayed concerns that they were never able to issue a “red” risk assessment and take the base out of service for any reason including, maintenance, fatigue, or weather.

One pilot stated that if that happened the “owner would be calling blowing up our phones, hey, ... why are you guys still out of service, why are you still out of service, where is the mechanic, is the mechanic working on it, is he done with that inspection yet or -- put the cowlings back on. Put it back together. We got to get back -- this is the culture of like ‘hurry, hurry, hurry, we cannot be out of service for anything.’”

In a case where the aircraft was about to overfly the 10% grace period on an inspection, a pilot stated that when he put the aircraft out of service, the owner attempted to convince him that the mechanic had completed the inspection and forgotten to sign it off in the logbook, however the pilot had already spoken with the mechanic who had told him that he had not conducted the inspection.

Pilots were concerned that mechanics were feeling pressure to complete maintenance because operations would not accept a “red” risk assessment. In addition, several pilots voiced concerns about management interfering with maintenance decisions. One pilot described an example where an aircraft was hot started at a temperature that required an engine inspection and management refused to allow the inspection. “It was a very hot start, ... And it upset [the mechanic]. He refused to put his name on anything regarding the situation and he threatened to quit.” Management offered to allow him to inspect the engine if he chose not to quit, “they opened up the engine and it was damaged.”

Another pilot described pressure he received from the director of safety and training to exceed his maximum 14-hour duty day so the aircraft would not be out of service. In this case, the pilot was approaching his maximum duty day after a long flight and coordinated with the medical crew to have the relief pilot pick them up from the hospital so he didn’t go over his maximum duty. After he got back to the airport “sure enough, [he] got a phone call from ops saying,.. ‘why did you leave your people there in the city?... that means your aircraft was out of service for an extra ... hour.’ And I was like, ‘well, I don’t want to bust ... my 14-hour duty day.’ And they were like, ‘well, honestly, we think you could’ve made it.’”

Another pilot stated that they were not allowed to go “red” on the risk assessment when the weather was below minimums. After he told OCC his base was red, they changed his risk assessment to

amber. When he pushed back on OCC, he received a call from the director of operations asking “why are you red? that's not the way we do things.”

#### **4.17.3 Management response to safety concerns about SF14 lead pilot**

The company described the base “lead” pilot as an administration role. When asked whether they would expect the lead pilot to be a role model from a safety standpoint, the director of safety and training said “of course... that leadership, that hard one, that lead by example thing... that’s what we try to instill in our lead pilots... But the oversight, ... we’re guilty of that. I haven’t been to each base or management doesn’t get to the bases... as often to see them perform.”

The SF14 safety representative had brainstormed ideas on how to rectify the base lead pilot. One pilot at another base stated that he confronted the SF14 lead pilot 4 or 5 times in the few months he had worked there. He relayed that when another pilot attempted to report their safety concerns to management that pilot said, “you're not going to believe it ... when I tell that [the base 14 lead pilot’s] flying under the weather ... [the chief pilot] said that ‘you don't tell on another pilot and if we have this conversation again, you'll be looking for another job.’” In one case, the base 14 lead pilot was “bragging” about flying along rain, lightning and launching into 500 ft ceilings.” During the interview, this pilot was asked if he confronted the SF 14 lead pilot about his concerns and he said “yes, I did. And soon after that, I was replaced as [the lead pilot at my base].”

The director of safety and training had said he researched the flights of concern and said that the weather was at their weather minimums. Upon hearing about the safety concerns from the medical crew (detailed in 4.15.3), the director of operations and chief pilot stated that they believed that the problem was interpersonal and not safety related. The director of operations stated that “it was the fact that [the lead pilot] was aggressive in that he was taking flights ... -- successfully -- ... that someone else had turned down and that he was too aggressive about it. And -- but that's all. And that was dealt with. There was no weather issues,... It all came back to his interpersonal things...” The chief pilot stated that “there was no clear violation of company policy or really nothing that ... garnered any punitive action...”

The DO, chief pilot, and director of safety and training reiterated that the problems were not safety related and there were no violations of company policy. The director of safety and training stated that medical crew did not “know as an experienced aviator what ceilings and visibility may or may not be.” In response to the medical crews’ concerns the company “reminded” the lead pilot to stay within weather minimums and sent him to conflict resolution training.

#### **4.17.4 GO – NO GO and inflight decision making with medical crew members**

Several pilots, paramedics, and nurses stated that Survival Flight had a policy of “three to go, and one to say no” regarding acceptance of a flight. This meant that all three crewmembers, the pilot, paramedic, and the nurse, had to agree to accept a flight and if anyone was uncomfortable, they could say “no” and the flight would be declined. Investigators were not able to locate any such policy written in company manuals or training programs.

This policy was inconsistent with several statements made by medical crew and pilots.

- One nurse described an instance where the medical crew had returned from a flight and a call had come in to go back to that area. The weather was moving in and she told her pilot who had just come on shift that they had just come from there and the weather was not good. This pilot said that they were going to try it anyway. After the nurse continued to voice her concerns about the weather after they took off, the pilot eventually turned around.
- A pilot relayed a flight where the windshield was accumulating ice. When the medical crew “said ‘hey, is that ice on the chin bubble on the front of the aircraft?’ the pilot was kind of a smart aleck about it, and said ‘oh, no, those are scratches on the windshield’ . . . And they said ‘no, that’s ice. You . . . either need to land -- . . . turn around or get out of it.’ And he didn’t communicate with them. He’s like ‘no, I think it’s going to be safer if I continue on. This is unforecast’-- so, anyways, so they ended up . . . turning around, coming back, landing. But that’s just kind of the culture, you know: ‘the med crew is always wrong, and they just need to sit back there and shut up’”

Management was asked how they handled cases where medical crew brought up safety issues about conducting flights. The director of operations stated that “the problem I have . . . is they’re asking people without the skill set to make decisions that they really don’t understand, aviation decisions. What I am saying is that people spend some fair amount of time and effort to become a meteorologist, to become a pilot, to become whatever. And someone walks in without any of those skill sets and now they have an equal place at the table to make those decisions. I struggle with that. I don’t want a nurse making a weather decision because she’s not trained to. But . . . you watch a flight take place, and you watch as that pilot gets ready to take off, and you watch the phones come out . . . and they’re favorite weather app . . . -- ‘okay, I got it. You’re concerned about your safety, me too. But I need you to feel safe with the [pilot] that we put with you.’” The director of safety and training provided insight on a case where medical crew believed a certain pilot was “pushing the weather” and stated “what happens a lot of times our medical folks really [do not] see what or know as an experienced aviator what ceilings and visibility may or may not be.” Management attitude was consistent with statements indicating that management was telling pilots during indoctrination that medical crews were “out to get you.”

Several other pilots disagreed with how management treated the concerns of medical crewmembers. One stated that while “they are by no means meteorologists and they are not pilots but they are not dumb individuals. They are very bright people that we work with.”

#### **4.17.5 Reporting culture**

A subset of pilots and medical crews who were interviewed were aware of an anonymous way to report safety concerns. A majority of interviewees stated they could approach their base safety representative with concerns, where others stated they could call management directly. The base 14 safety representative, the accident pilot, was known as being very approachable and proactive to safety.

While personnel were aware of the ways to report concerns, a number of them were uncomfortable voicing concerns due to fear of reprimand by management and the lack of previous management action on voiced safety concerns. One pilot stated “God forbid I have to turn in a safety form without the owner of the company calling and harassing us.” He further stated that “I could call the director of ops, ... and that would go nowhere.” Pilots did not feel like they could call in fatigued because “it would get shot down right away.” Another pilot stated that he was not aware of a way to report safety concerns without “getting himself in trouble.”

One medical crewmember who had formally documented his safety concerns regarding the harassment of pilots by the chief pilot in a letter to human resources stated that he never received a resolution. After hearing from the director of safety and training that he (the director) had not received any notification from HR regarding the concern, “ HR started lying to me about this, saying that they had... talked about this [with the director of safety and training]. And at that point I knew that the company didn't have my best interests at hand.” When the chief pilot came to the base some time later, he said that he had heard about the concern. The interviewee stated that the chief pilot doubled down on his position and said that “he knows what he's talking about and he's right in his decisions, meaning pushing us to take flights.”

The director of safety and training was concerned about reports about the chief pilot, “from a safety standpoint... you don't reprimand somebody while on shift ...that's a safety violation.” He stated when he heard about these reports, he told the director of operations and the director of operations took care of it. The director of safety and training did not get any more feedback on how it was addressed.

When the director of safety and training was asked if he felt pilots were comfortable reporting safety issues, he said that “if the reports I'm getting of these reprimands on shift and stuff is... accurate, then ... they're not comfortable.”

## **5.0 Regulatory oversight**

The Certificate Management Team (CMT) for the operator was comprised of a Principal Maintenance Inspector (PMI), a Principal Operations Inspector (POI), and a Principal Avionics Inspector (PAI). The CMT is responsible to ensure legal compliance of the operator with FAA rules and regulations.

The POI at the time of the accident held an air transport pilot (ATP) certificate with a multi-engine land rating and he had commercial privileges for single engine land airplanes. He was also a certified flight instructor, instrument flight instructor and multi-engine instructor. He started his professional career “check hauling” for a Part 135 operator. He then went to work at a Part 121 airline. He was hired at the FAA in August 2012. When asked when he became POI for Viking Aviation, he stated that he believed it might have been 2014.

In an interview with the POI, he stated that he had fixed wing ratings on his pilot certificate and had extensive fixed wing experience, but his rotorcraft experience was limited to about 2 to 3 hours in a Robinson R44 helicopter. He stated that he did not have any rotorcraft pilot certificates and

he was not able to observe helicopter flight training because his FAA qualification matrix did not allow him to<sup>26</sup>. He stated that he was also assigned six other Part 135 operators, one of which was a single-pilot operation and he devoted about 60 percent of his time to the Viking Aviation certificate. Additionally, he estimated he had oversight responsibility for about 40 Part 137 certificates. He noted that he and the PMI performed surveillance at the Columbus bases (SF13 and SF14) in the fall of 2018 as part of a new base inspection.

When asked how the surveillance of Viking had changed since the implementation of the FAA's Safety Assurance System (SAS), he stated that SAS had implemented a "6-month cycle" program. He stated that SAS assigned, depending on amount of risk, the number of required inspections. In the case of Viking Aviation, it was "every 6 months or 2 quarters." He said that some of the inspections would be completed in Batesville, and some in the outstations. For the inspections, since training was accomplished mostly in Batesville, the training program inspections would be accomplished there along with any OCC inspections. The outstation inspections would "be more high level, like operational control, paperwork..." He stated that the last time he visited the Columbus bases was in August 2018 for the new base inspection. He stated that he personally surveilled Viking in the fourth quarter of fiscal year (FY) 2018 and also in the first quarter of FY 2019 prior to the government shut-down and then again following the shut-down for the FY 2019 second quarter surveillance.

Due to the company being spread out, the FAA utilized geographic inspectors to assist in the surveillance plan. He stated that when inspectors conducted the geographic surveillance, they were provided access to the company manuals through the SAS data collection tool. When asked if the inspectors reported back to him each time or only if there is a finding, he stated: "[s]o the way it works with the safety assurance system is you send them the specific questions and items you want looked at with the manuals, and then they do the reporting through the safety assurance system. Then once that comes back, I get a notification and I review their finding." When asked if the person conducting the surveillance ever calls to discuss it or if he ever checked in with the person for more information than what was included in SAS, he stated that it was "mostly done through SAS."

An inspection report showed that in fiscal years 2017, 2018, and 2019 there were a total of 51 surveillance activities with no unfavorable findings.

An audit report by the Department of Transportation Office of Inspector General, dated April 8, 2015 noted:<sup>27</sup>

*"FAA hires inspectors rated in commercial airplanes even though some are assigned to oversee helicopter operators. FAA's inspector qualification standards require experience with single and multiple engine airplanes, not helicopters. However, this focus on larger aircraft experience has left shortages of helicopter inspectors. For example, we identified a shortage of helicopter inspectors in four of the seven smaller HEMS oversight offices we*

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<sup>26</sup> See Attachment 17: FAA Order 8900.1, Volume 1, Chapter 3, Section 6: Operations Inspector Qualifications and Currency Overview

<sup>27</sup> This report can be found in Attachment 10

*visited. Because of the unique operating characteristics of HEMS, inspectors with helicopter experience may be better suited to identify HEMS-specific risks.”*

## **5.1 Bell 206 training versus Bell 407 training**

FAA Order 8900.1 CHG 555 stated that due to differences in instrumentation and installed equipment, the skills and knowledge required to operate a variation of an aircraft type can differ and that crew members trained in one variation of an aircraft may require additional training to safely and efficiently operate another variation.<sup>28</sup> The order goes on to state that if a Flight Standardization Board (FSB) report exists that contains Master Differences Requirements (MDR) for the aircraft variation that the proposed training must comply with the requirements of the FSB report. An FSB report for the Bell 407 Premier Aviation, Inc., IFR Configuration STC SR09244RC noted:<sup>29</sup>

*“Although the model Bell-407 is a derivative of the Bell-206, the main rotor, engine, engine control system (FADEC), hydraulic system, drive train, and tail rotor are significantly different from the Bell-206. The systems, handling qualities, and characteristics of the Bell model 407 itself requires specific training.”*

Order 8900.1 stated that the operator must submit a differences evaluation and an outline of the differences training curricula. For part 135 operators, the POI would review the analysis and proposed training submitted by the certificate holder and consult with the FAA Aircraft Evaluation Division (AFS-100) if necessary, before approving the differences training and incorporation into the operator’s training manual. Survival Flight’s training manual only contained a table listing the differences in aircraft specifications with no specific training curricula.

In addition, 14 CFR Part 135.293 (b), “Initial and recurrent pilot testing requirements” stated:

*“(b) No certificate holder may use a pilot, nor may any person serve as a pilot, in any aircraft unless, since the beginning of the 12th calendar month before that service, that pilot has passed a competency check given by the Administrator or an authorized check pilot in that class of aircraft, if single-engine airplane other than turbojet, or that type of aircraft, if helicopter, multiengine airplane, or turbojet airplane, to determine the pilot's competence in practical skills and techniques in that aircraft or class of aircraft. The extent of the competency check shall be determined by the Administrator or authorized check pilot conducting the competency check. The competency check may include any of the maneuvers and procedures currently required for the original issuance of the particular pilot certificate required for the operations authorized and appropriate to the category, class and type of aircraft involved. For the purposes of this paragraph, type, as to an airplane, means any one of a group of airplanes determined by the Administrator to have a similar means of propulsion, the same manufacturer, and no significantly different handling or flight characteristics. For the purposes of this paragraph, type, as to a helicopter, means a basic make and model.”*

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<sup>28</sup> All further references to FAA Order 8900.1 refer to CHG 555.

<sup>29</sup> This report can be found in Attachment 8.

The preamble to §135.293(b), as contained in the Federal Register, volume 43, number 196, dated October 10, 1978 states in part, “The handling and flight characteristics of light helicopters are significantly different. The equipment available for them also is considerably different. A separate flight check is necessary to judge pilot competence properly. As additional helicopters become available and standardization of various models is accomplished, competency check requirements will be established similar to those for airplanes.”<sup>30</sup>

The make and model specific competency check requirement for Part 135 helicopter operations was reiterated in a legal interpretation dated August 13, 2009, and addressed to Aircoastal Helicopters, Inc. The FAA restated in that interpretation that helicopter “type” for these purposes is defined as “basic make and model.”

When the POI was asked if a competency check in the BHT-206 allowed the pilot to operate a BHT-407, he stated “the way that their training program is approved right now, they do have just a differences training for the 407, but it does list it on the same type certificate data sheet. But right now there's some interpretation above my pay grade of whether that satisfies any regulatory requirement specifically with the 206 or 407.” When asked what guidance was used to show that helicopters on the same TCDS could be used for the competency check, he referred back to FAA Order 8900.1 stating: “The 8900.1 guidance when it comes to differences training only allows us to approve a differences as opposed to a specific, if it is listed on the same type certificate data sheet.”

FAA Order 8900.1, volume 1, chapter 1, section 1 stated, in part: “If the guidance in this order conflicts with 14 CFR, 14 CFR takes precedence.”

## **6.0 Post-Accident Regulatory Oversight**

After the accident, the FAA completed 899 data collection tools (DCTs)<sup>31</sup> within the safety assurance system (SAS). Out of the 899 DCTs performed after the accident there were 26 negative findings. While some of the findings utilized the same explanation, the following were the unique negative finding explanations that relate to company operations. Additional findings were present, but related to maintenance items.

*“135.619(b) requires each certificate holder conducting helicopter air ambulance operations must provide enough operations control specialists at each operations control center to ensure the certificate holder maintains operational control of each flight. During observations of the Operational Control Center during marginal weather days it was discovered that there was no delineation between the Communication Specialist and Operational Control Specialist duties. There were instances where the Operational Control Specialist would be accepting phone calls from customers and flight requests from*

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<sup>30</sup> The preamble text can be found in Attachment 7

<sup>31</sup> Aviation safety inspectors use Data Collection Tools (DCT) to document assessments of the certificate holder’s or applicant’s design of systems, surveillance of certificate holder performance, identification of safety concerns or statutory/regulatory noncompliance, and any other relevant information.

*hospitals. At times phone calls were answered that needed to be sent to membership or other parts of the company outside of flight operations. Observations of the high workload time of shift change at the outstations showed that the initial check in and estimated risk assessments were not completed in a timely manner due to the high call volume and limited staff. There was only one Operational Control Specialist and one Communication Specialist for 15 bases and a fixed wing operation. It was observed that during times when multiple flights are being launched and during the 0700 and 1900 local time check in shift change the phone calls could overwhelm the two staff members.*

*The FAA Approved risk assessment requires that the operational control specialist and Pilot in Command completes the risk assessment worksheet prior to each flight leg. (GOM Appendix 3, GOM L-5). During interviews of pilots and Operational Control Specialists there was confusion about when and how to document the completion of that preflight risk assessment. Specifically when the weather risk assessment was listed as "Green". There was completion of the Risk Assessments prior to individual flights, but the procedures and utilization of the risk assessment was being conducted according to unwritten procedures.*

*135.617(c) requires Prior to the first leg of each helicopter air ambulance operation, the pilot in command must conduct a preflight risk analysis and complete the preflight risk analysis worksheet in accordance with the certificate holder's FAA-approved procedures. The pilot in command must sign the preflight risk analysis worksheet and specify the date and time it was completed. Review of the Viking Aviation Form 130 and Form 129 at multiple bases and the Operational Control Center revealed that there is no place on the form to sign, date and time nor was this being documented other than in the Operational Control Center CAD system.*

*The FAA Approved risk assessment requires that the operational control specialist completes the risk assessment worksheet prior to each flight leg. (GOM Appendix 3, GOM L-5, GOM T-2 and T-7) During an observation in the OCC located in Batesville, AR Flight Release 02-574 was a PR flight from Survival Flight base 15 Dothan, AL to a hospital. The OCS tracked the pilot to the hospital for the PR. The Communication Specialist received a call for a scene flight located about 15 minutes from the hospital. The pilot accepted the flight and the OCS failed to complete a preflight Risk Assessment for the new flight. A new flight release number was not generated and the OCS did not complete or confirm a new Risk Assessment was completed prior to launching for the scene flight which was located at an airport. It was also noted that SF 7, SF 8, and SF 10 all had weather that was below FAA minimums but still showing as an Amber flight release which is contrary to the FAA approved risk assessment.*

*The Operational Control Policies and Procedures manual Rev.1 Page 7 specifically lists the duties of the Communication Specialists. During a multiple day observation of the OCC it was noted that there was no delineation of Communication Specialists and Operational Control Specialists duties. When it got busy the OCS would be also taking phone calls from the customers and then directly contacting the pilot. There is a difference in the duties and maximum duty times of OCS and CS so delineation is needed to ensure that the duties of OCS are being covered during the legal duty times.*

*The FAA Approved risk assessment requires that the operational control specialist completes the risk assessment worksheet prior to each flight leg. (GOM Appendix 3, GOM L-5, GOM T-2 and T-7) During an observation in the OCC located in Batesville, AR Flight Release 02-574 was a PR flight from Survival Flight base 15 Dothan, AL to a hospital. The OCS tracked the pilot to the hospital for the PR. The Communication Specialist received a call for a scene flight located about 15 minutes from the hospital. The pilot accepted the flight and the OCS failed to complete a preflight Risk Assessment for the new flight. A new flight release number was not generated and the OCS did not complete or confirm a new Risk Assessment was completed prior to launching for the scene flight which was located at an airport. It was also noted that SF 7, SF 8, and SF 10 all had weather that was below FAA minimums but still showing as an Amber flight release which is contrary to the FAA approved risk assessment.*

*The FAA Approved risk assessment requires that the operational control specialist completes the risk assessment worksheet prior to each flight leg. (GOM Appendix 3, GOM L-5, GOM T-2 and T-7) During an multiple day observation in the OCC located in Batesville, AR there were numerous instances where the Operational Control Specialists did not complete or document that they agreed with the Pilot in Commands Risk Assessment and completed the Risk Assessment on OCC Form 130. SF 4 attempted to take a flight from BVX to Harrison, AR. The weather was below FAA minimums and the OCS refused to agree and told the pilot to not take the flight. The flight was turned down for weather. The OCS failed to complete Form 130 for the turndown even though they conducted a Risk Assessment. The CS failed to complete the turndown on [www.weatherturndown.com](http://www.weatherturndown.com) as required by Operational Control Center Procedures manual page 31.*

*135.617 requires the completion of a preflight risk assessment be completed prior to every flight. During multiple interviews with pilots and Operational Control Specialists it was determined that during training the Pre Flight Risk Assessment was not being taught in enough detail. This was not known to the Director of Operations, and it caused confusion from the Pilot in Command and Operational Control Specialists.*

*The GOM and FAA approved pre-flight risk assessment requires after a pilot receives a flight request they document the completion of the risk assessment and release number on form 130 prior to takeoff. On 06/19/19 I observed a flight request transmitted to the pilot in command at 29AR. The flight was from Newport, AR to Little Rock, AR inter-facility transfer. The pilot in command failed to document the review of the minimum safe altitude and did not document the flight release number.*

*GOM Rev.11 Page B-1 B.1.1 requires that medical crew equipment be weighed every 30 days. Reviewed medical crew equipment list and last date weighed was 1/5/2019*

*FAA Approved General Training Manual Rev. 6 dated 8/20/2018 and PIC BHT-206 Series training program Rev. 5 dated 9.15/2017 requires that the BHT-407 Differences flight training is documented in the crew members ground and flight training record. A review*

*of 30% of the flight crew members records were evaluated. It was found that on numerous VA Form T-410 and T-411 the appropriate "initial, recurrent, requalification" was not circled as required on the form. It was found that numerous records did not have the Differences training for BHT-407 documented on Form T-404 for the ground training. Form T-411 certificate of flight training did not have documentation of the completion of 8-1 Differences training. There were some instances where the BHT-407 differences training was documented on Form T-403 which is the miscellaneous training record."*

## **7.0 FAA definition of severe weather**

The NTSB received the following response to an inquiry to the FAA regarding the definition of "severe weather" as defined in the amendment to 135.611 that appears in the Federal Register, Volume 84, Number 143.

"The simple answer to the question is that "severe weather" is not defined in the CFRs. It is, however, a term that is used throughout FAA documents (regulations, Advisory Circulars, the AIM, the Weather Handbook, and 8900.1 guidance) and applies to thunderstorms and other types of weather phenomena."

## **F. REFERENCES**

Garmin GTN 625/635/650 Pilot's Guide, 190-01004-03 Rev D. Garmin., Olathe, KS, USA. Mar. 2011, pp.10-35. Accessed on: June 01, 2019. [Online]. Available: [https://static.garmincdn.com/pumac/190-01004-03\\_0B\\_web.pdf](https://static.garmincdn.com/pumac/190-01004-03_0B_web.pdf)

## **G. ATTACHMENTS**

- Attachment 1 – Company interviews
- Attachment 2 – FAA interviews
- Attachment 3 – Hospital interviews
- Attachment 4 – Accident nurse letter to human resources
- Attachment 5 – Excerpts from SF14 Shift Briefing/Debriefing Forms (Form 131)
- Attachment 6 – Survival Flight company forms
- Attachment 7 – Regulatory preamble to §135.293(b)
- Attachment 8 – Flight Standardization Board report on Bell Model 407 Premier Aviation, Inc., IFR Configuration STC SR09244RC
- Attachment 9 – 2009 FAA legal interpretation on 14 CFR Part 135.293 - Initial and recurrent pilot testing requirements
- Attachment 10 – Department of Transportation Inspector General report on Delays in meeting statutory requirements and oversight challenges reduce FAA's opportunities to enhance HEMS safety
- Attachment 11 – Pilot training records
- Attachment 12 – Company flight release records (Forms 130 and 130-OCC)

- Attachment 13 – Pilot flight duty logs
- Attachment 14 – Company OCC shift change checklists
- Attachment 15 – Base 14 flight records
- Attachment 16 – FAA surveillance activity
- Attachment 17 - FAA Order 8900.1, Volume 1, Chapter 3, Section 6: Operations Inspector  
Qualifications and Currency Overview
- Attachment 18 – Interviews with operators who declined accident flight request
- Attachment 19 – NTSB calculated weight and balance
- Attachment 20 – 2009 FAA legal interpretation regarding flight in known icing conditions